

21  
Devonian

Iowa, Michigan, Illinois, Missouri  
Wisconsin, Minnesota

July 22

Visited S side Long Lake. Locality of abundant *Cystina* at NE  $\frac{1}{4}$  36. was undoubtedly derived from locality about  $\frac{1}{3}$  mile north of Alpena Co. line on east side sec. 31. Rock in place at NE  $\frac{1}{4}$  36 is Genshaw just below *G. romingeri*.

Genshaw on new maps and on a sign at Long Lake is spelled Genschaw.

Michigan Alkali Co at Rogers City is now part of Wyandotte Chemicals. Michigan Limestone & Chemical Co. on engines.

Big Oy in Alpena is Huron Portland Cement Co.

Ask Reiman to be careful about wax used in crinoid models.



## Digest of Graham Mss.

Section 9. - sec. 6-32N-9E. Low bluff 16' high extending NW & commencing  $\frac{1}{2}$  mi. from Lake shore. Traceable for a mile or more Coral ls. Rominger p. 50.  
Rockport ls.

Section 10 - G. loc. 19. - SW  $\frac{1}{4}$  36-33N-8E. - Sink holes just N of county line in Presque Isle Co. A dozen separate depressions. Upper 20' or 30' are basal Long Lake = Rockport, below is the blue Bell shale.

Section 11 Loc. 37 - Grand Lake Ledges 6-33N-8E.

- c - thin-bedded calcarenites with Ceratopora.
- b - fine grained compact ls. with large corals
- a - shaly argillaceous calcarenites with muscine layers.

This is the Rockport ls.

Section 12 ~~loc 25~~ <sup>SW</sup> SW cor 36-32N-8E

SW  $\frac{1}{4}$  SW  $\frac{1}{4}$  36-33N-8E = loc. 75

SW  $\frac{1}{4}$  SE  $\frac{1}{4}$  35-33N-8E = loc. 18

SW  $\frac{1}{4}$  NW  $\frac{1}{4}$  35 (Rabiteaus form) = loc. 14.

All Genshaw

Sect. 13

Abandoned shale pit A.P.C. Co., NE  $\frac{1}{4}$  SE  $\frac{1}{4}$  18-32N-9E = loc. 31. Said to be about 20' above level of Lake Huron or at 600'

Well in Genshaw ridge S of pit shows 13' of ls and 35' of shale.



Sect 14 - S of Middle Lake and between it and Long Lake Valley is the second ls. terrace. Can be traced from shore S of A.P.C.Co. clay pit. NW through sec 19-32N-9E & secs. 13, 11 and 3, 32N-8E. Exposures are at east end Long Lake, sec. 11, & near school house S of county line (E side Sec. 3).

Impure calcarenite, many silicified fossils. 23' assigned on basis of formation 10 in Churchill well equalling the Genabaw.

Section 15 - Waseys Well (El Cajon Clay) near E line sec. 19-32N-9E, 20' bluish clay = Bed 9 of Churchill well. Fossils are *Sp. numeratus*, *S. dermossa*, *L. perplana*, *C. coronatus*, *C. sp.*, *Athyris fultoniensis*. This must equal our upper Ferron Point. ~~This is not related to anything at El Cajon~~

Sect 16 - El Cajon Beach 10-31N-9E. (loc. 76) On beach & just behind it is clay with *Sp. numeratus* & *C. coronatus* same as at A.P.C.Co. pit.

Sect. 17 Terrace S of Hell Creek appears to be continuation of the one behind El Cajon Beach. Section is opened where terrace is crossed by tracks of



A.P.C.C., 2 mi. S. of clay pit  
NW $\frac{1}{4}$  30-32N-9E (loc. 30)

*G. romingeri* is common with large  
*Schizophoria*, large *Atrypa*, *Athyris*, *Sp. owenii*,  
*S. macroa*, etc. This is Henshaw and  
probably same as upper bed in A.P.C.C.  
pit.

Sect. 18. Sec line between secs. 24 & 25 - 32N-8E.  
~~Somewhat higher than 17 but essentially~~  
Somewhat higher than 17 but essentially  
same horizon.

Sect. 18a Hell Creek Fall # SE $\frac{1}{4}$  23-32N-8E  
G loc. 10. I think this should be NE $\frac{1}{4}$  28.

Sect. 19. Locs. 32, 33a and 33 - begin at fork of  
road S of Long Lake and extend NW to  
Summerville on the lake. ~~Loc~~ The  
exposures are of one bed but loc 34  
is shalier beds a little lower down.  
This is Henshaw.

Sect. 20 - Loc. 27 - Terrace crowning N & S section  
lines midway between secs. 25 & 26 - 32N-  
8E. Beds appear to be above those of  
Sect. 19. *Gastina alpenensis*. This is upper  
most Henshaw of the Wessel Road.



Sect. 21 - Outcrops on Long Lake Rd. between sec. 26 & 27-32 N-8 E. This is Killians outcrop of A57 = G. loc. 7. 0.2 mi. farther south is a black shale (loc 6) abounding in S. solidicosta.

Sect. 22. - Misery Bay or Little Thunder Bay (NW 1/4 SW 1/4 sec. 15-31 N-9 E = loc. 20) - large sink at head of inlet. Grabau gives robust Atrypa, G. romingeri & Deluzophoria = Genshaw. According to our map this is the head of El Cajon Bay.

Grabau never saw  
located Misery  
Bay incorrectly

Sect. 23 - loc. 26 - Thunder Bay Island.  
Low ledges ls; Stenotopora most abundant, up to 5' in diameter. On east side island ls. separated by bituminous beds. Black shale contains Strophodontia costata & branching Favosites. Grabau says these may represent the beds 50-75' below the top of the Alpena (= Killians) or more likely the beds 120' below surface in well 26. Black shales of sect. 21 are undoubtedly the same. The same rock occurs on Sugar Island



Locality 42 (Grabau's locality) is described in pages 202-204 of Grabau's "Stratigraphy of the Traverse group of Michigan," in Lane's Report of the State Board of Geological Survey for the Year 1901 (publication date 1902). According to Grabau (p. 202) locality 42 is the same as Winchell's locality 861. The Petoskey Portland Cement Company (now owned and operated by the Penn-Dixie Portland Cement Co.) cut back the shore exposures of Winchell's time in the development of the quarry wall. Letters A - I after Grabau's locality number 42 are units in Grabau's section. In my opinion the section, described and measured by Grabau, was somewhere near the eastern end of the Penn-Dixie quarry. I believe that Unit D is most likely Pohl's "Lower Blue Shale" of the Gravel Point formation. Grabau (p. 203) states that unit D has a thickness of 3 feet, which is greater than that noted by other workers.

Sect. 24 Outcrop in SE cor sec. 1 - 31N-8E - loc. 75c.  
and extending along section line E.  
across RR of A.P.C. Co. and between secs.  
6 + 7 (31N-9E) for 1/2 mile or more  
yellowish gray, fine-grained calcarenite.

Sect. 25 - Long Lake Rd. nr. school + Town Hall.  
NW 1/4 25 (loc. 3) and SE 1/4 27 (loc. 4) - 32N-8E.  
Loc 4 is a crinoidal ls. with *S. solidicosta*  
c. Total thickness is 20'.

Sect. 26 At school house sec. 11 - 31N-8E. (loc. 75b.)  
one mile E of Long Lake Rd. Beds about  
30' above sect. 25. This is Alpena.

Sect. 27 - Outcrops in rd. SW 1/4 sec. 12 - 31N-8E  
loc 75. 20-25' above preceding. Porous  
x-line ls. with Pentamerella

Sect. 28 Roadside farm near center east side  
3 - 31N-8E. continuation of 27. Porous  
calcarenite, many bryozoa (fenestellid)

Sect. 29 Mid-line sec. 3 - 31N-8E. a short distance  
from Long Lake Rd. (loc. 16). Above preceding  
sections but below Qy.

Sect. 30. Quarries in N. end of Alpena  
Fox Qy, SE 1/4 14 - 31N-8E.; Collins Qy..  
SW 1/4 sec 13 - 31N-8E. Reef masses



A well on Dock St. showed high beds.  
6' of clay. The clay is overlain  
by a thin-bedded x-line calcarenite  
(loc. 1c) from 2-3" thick, weathering  
brown. It is filled with a small  
Cyrtina umbonata, Strophodonta,  
Sp. mucronatus & Atrypa.

Sect. 31 Qy. Alp. Port. Cement Co. N.# 1/4 sec. 24-  
31 N-8 E (loc. 9). In upper 30' of  
Alpena ls. reefs well shown

Sect. 32 Warner Brick yard - SW 1/4 NW 1/4 27-31 N-8 E  
Following species from thin-bedded ls.  
with shale partings of 1'  
Mugil. latro? 6-8' of clay  
Dolot. triadactylus exposed  
Cidaster pyramidatus  
Fav. alpenensis  
F. hamiltonensis  
Striatopora rugosa  
Dendropera alternalis  
Craspedophyllum archiaci  
Schizophoria propinqua  
Rhip. vanuxemi  
Sp. andaculus  
D. romingeri  
Pent. papilionensis  
Cyrtina hamiltonensis  
Stroph. solidicosta  
Cryptonella

Probably Potter's Farm  
Dec 10/11/13



Sect. 33 Stony Point SW  $\frac{1}{4}$  & SW  $\frac{1}{4}$  27-31 N-8 E.  
Hobbs thinks 100' intervene between here  
and the upper Alpena ls. of the quarries.  
Athyris, Pentamerella, Sp. mucronatus,  
Sp. consobrinus, Cyrt. hamiltonensis, S. deirasa  
suggest lower Norway Point. S. loc. 22.

Sect. 34 Potter Farm SE cor. 20-31 N-8 E.  
S. loc. 77 to SE. cor. sect. 19 = loc. 78.  
4 terraces. Beginning at Thunder  
Bay River is a clay underlying the river,  
said to be same as at Warner  
Brick Yard. Succeeded by thin bedded  
argillaceous ls. cropping out on road  
near cemetery. Corals are common here.  
Then follow 15' shales. Then follows  
a terrace ~~with ls.~~ capped by ls. with  
Favosites & *Eldistroma cylindrica*.  
Then follows thin-bedded calcilutites  
alternating occasionally with fine-  
grained calcarenites. Corals abundant.  
Beyond section line (SE. cor. 19) in a  
flat field occur numerous local  
blocks containing *Stromatopora* and  
4th terrace occurs just E. of school  
in sec. 19. Total rock exposure in  
this section is between 40 + 50'.  
beginning at Stony Pt ls. at Terrace 1.





Sect. 35 Stone crusher W. of school house near center S line Sec. 19. = loc. 79.  
 Thin-bedded ls. with byzonia + Stroms. ----- 1' 6"  
*Atthis*, *S. erratica*, *Conocardium*  
*Cylindrophylloids*  
 Bituminous sh. ----- 1" - 6"  
 Ls. similar to higher beds ----- 1' 2"  
*Cylindrophylloids*, *Conocardium*, *Atthis*  
*Strophodontia erratica*.  
 Crinoidal ls. ----- 4' 6"  
 The *Conocardium* beds overlie section 34.

Sect. 36 4-Mile Dam; Fletcher Dam; = loc. 21  
 7-31N-8E. Formerly called Broadwells  
 Sawmill. Reef in river bottom. Beds  
 dip 8° downstream on flank of reef.

Sect. 37 Boone Co. Dam, 7-Mile Dam. SW 1/4 2-31N-7E  
 = loc. 24. Rominger's list (p. 44) includes  
*Sp. divanica* from shales. Along left  
 bank of stream below dam there are  
 15' of strata, at base 4' uncracked with  
 small corals + *Sp. divanica*. Followed by 1'  
 of sub-x-line ls. with *Cyrtina umbonata*  
 (small variety). Above *Cyrtina* beds  
 are 6' bluish sh. unfossiliferous. These  
 are succeeded by fossiliferous calcareous  
 beds. Highest beds are 20' above base  
 of section and are exposed between  
 gorge & highway. Fossils are same as at



~~base~~ section (base) on south side of river at Norway Pt.

According to Rominger the same beds found at Boom company's dam (Ironbridges mill) crop out again under the bridge which crosses the north branch of Thunder Bay River (NE  $\frac{1}{4}$  32-32 N-7E). If this correlation is correct, a distinct southward deflection of the strike of the strata is indicated. This, and a flattening of the dip as the strike approaches an east-west direction, is also indicated by other strata.

Sect. 38    Marsters well 34-32 N-6E. See Rominger pp. 45-46.

Section 39 = loc. 23. Shore of 11-30 N-8E. Estimated by Grabau to be 20 or 30' above the Conocardium bed of Sect. 35 (loc. 79). According to G. the interval seems to be occupied by soft shales.

Sect. 40    John J. McTellans clearing SE  $\frac{1}{4}$  17-31 N-7E = loc. 102). Grabau's goniatite locality



Sect. 41 Bolton - SW  $\frac{1}{4}$  5 - 32 N - 7 E. (loc. 95)  
about  $1\frac{1}{2}$  mi. N W. of Bolton Sta. several  
quarries in lower Alpena.

Top layer is crinoidal ls. containing  
heads & joints of Dolotocrinus. Below  
occurs ls. & sh. with brachs. Below  
this crinoidal ls. again to bottom of  
qy. which is about 8' deep.

Sp. pennatus	Pent. papilionensis
Sp. mucronatus	At. utricularis
St. concava	At. spinosa
St. solidior this	Ag. t. hamiltonensis
St. erraticus	P. flabellum
St. perpluma	
St. naeaea	
St. demissa	
St. jinia?	

Sect. 42 Krakaw ls. hill (NW  $\frac{1}{4}$  20 & NE  $\frac{1}{4}$  19  
34 N - 7 E. (loc. 86). Thin bedded ls.  
with Acervularia, St. naeaea. A continuation  
of ridge S of Grand Lake & comprises  
Grand Lake ls. = Rockport

Sect. 43. Terrace running NW-SE. through  
NE cor. 33 & NW cor 34 - 34 N - 6 E (loc. 85)  
Direction of terrace is N 50° W. Thin  
bedded, impure calcarenite. Fossils  
are silicified. A large form of  
G. romingeri predominates but  
with it a large Atrypa & Productella  
This is Genesaw. List follows:





*Strom. globulifera*

*S. mucronatus*

*S. oregoni*

*S. johnsoni*

*Productella*

*S. romingeri robust*

*Atrypa*

*Athyris membrata*

*Crassema luecklaeni*

*S. demissa*

*S. erratica*

*S. solidicosta*

*S. altidorsata*

*P. flabellum*

On farm at summit of ridge a well revealed

d Soil 3'

c Lo. like that on cliff 35'

b blue clay (El Cajon) 8'

a Black lo. 21.5'

From the blue clay (b) were obtained  
*C. coronatus*, *A. reticularis*, *S. johnsoni*,  
*S. mucronatus*, *Schiz. iowensis*, *Productella*  
*C. luecklaeni*, *Cyst. hamiltonensis*,  
*S. demissa*, *P. flabellum*.

Tenaces passes S of Lake Augusta  
and appears to be continuous with  
that along S. border of Long Lake. It  
has been traced through sec 34, T 34 N  
+ sec. 2 + 1, T 33 N - 16 E. On sec. 35  
SE of Lake Augusta makes a Southward  
restrant. From here it extends  
along tp. line between T 33 + T 34.

8 1/2' clay shows thinning of upper  
Fenton Pt.



Higher beds of this series crop out at center section line between sec. 33+34. a  $\frac{1}{4}$ - $\frac{1}{2}$  mile S of the cliff (loc. 84). Fossils + rock here resemble those of sect. 19 near Summerville.

Sect. 44 - On tp. line between 33+34 on center line of range 6 E. immediately N. of schoolhouse (loc. 83). Crinoidal ls. with *S. johnsoni*, *Atthis incurvata*, *Phillipsastrea gigas*, *G. romingeri*. About 30' above those of preceding loc.

Sect. 45 - On center line of R 6 E a mile S of N line of T 33 N - 2 outcrops. One 100 yds. n. of town line (loc. 82), the other just S of the Catholic church beds (Posen loc. 81). The beds lie 30-40 above those of the preceding. Continuation of beds of sec. 20. This is upper Genesaw with *Cyrt. alpenensis*.

Sect. 46 - Terrace crossing N line of 33 N between secs. 4+5 R 6 E (loc. 91). Terrace extends N 45° W. continuation of lower ridge of preceding sect.



Sect. 47 - SW $\frac{1}{4}$  SW $\frac{1}{4}$  10 - 33 N - 8 E - loc. 80.

On woods opposite Posen ledges of Alpena Co.

Sect. 48 - On section line W side of SW $\frac{1}{4}$  of sec. 14 - 33 N - 6 E (loc 94) - Alpena Co.

Sect. 49. Terrace on sec. line between secs. 7 & 8 - 33 N - 6 E. loc 90. half-way between N line of section & R.R. Terrace runs NW & is 15-20' high. *Athyis* & *Strophodontia* abundant. *C. coronatus* in shaly beds.

Outcrops from a mile and a half to 2 miles W. of Posen & S. of R.R. 7-8, 17-18 - 33 N - 6 E.

A mile &  $\frac{3}{4}$  W of Posen (NW $\frac{1}{4}$  sec. 17 - loc. 87) half way between section line and schoolhouse no. 5 are calcilutites with *S. per plana*, *Chonetes*.  $\frac{1}{4}$  mile further W. on NE cor 18 (loc 88) a low ridge running N 60° W crosses road. *Gonophoreoids* abundant.

Sect. 51 - SW cor 17 - 33 N - 6 E. (loc. 89) ls. ridge crosses section line in NW-SE direction, *Cinoides* and contains *Gratopora*.

Sect. 52 - Sunkers Lake center sec. 32 - T33 N - R6 E (loc. 93). At west end of lake is a sink 60-70' in diameter & 65' deep. Section in West wall:



10. Lo. calcarenites, not well exposed 10'
9. Dolatocrinus bed - calc. sh., two siliceo argillaceous blue fossiliferous calcarenites resembling Four-Mile Dam Alpena. 1'6"
- |                     |                     |
|---------------------|---------------------|
| Dolat. asterias     | Cyt. alpenensis     |
| F. placenta         | Stroph. levis       |
| F. limitaris?       | S. concava          |
| Cyath. traversensis | S. naevia           |
| A. reticularis      | S. solidicosta      |
| Sp. cf. euryteines  | G. romingeri        |
| S. pennatus         | Pent. papilionensis |
| Stromatopora nux    | P. flabellum        |
| Cyt. hamiltonensis  |                     |
8. Crinoidal ls in beds 1/2 - 2' thick - Stromatopora - 10'
7. Shaly layer, similar to Dolat. bed - - - 1'6"
6. Ls like 8 but with coral masses. 10'
5. more shaly beds 1'
4. ls. like 6 5'
3. Coralline ls. 5'
2. Carbonaceous strata 2'
1. Talus slope 20'
- 
- 65'

Sect. 53 McArthur's Farm 8 mi. SW. of Crawford's Qy. (Rominger p. 52)

Sect. 54. Rainy River, 4 miles from its entrance into Black Lake, NE of Onaway 35N-2E. Rominger gives section of 30'-40'.

Sect. 55 - Black Lake (SW  $\frac{1}{4}$  NW  $\frac{1}{4}$  - 7 - 35 N - 2 E  
(loc-97). 30' cliff of uniform calcilutite  
with scattered x ls of calcite. Upper  
Rockport.

Sect. 56 - Onaway SW  $\frac{1}{4}$  sec. 6 - 34 N - 2 E.  
loc 98 and S side sec. 1 - 34 N - 1 E.  
Cheboygan Co. loc. 99. Semi-x-line  
calcareous = lower Alpena according  
to Grabau.



July 26, 1934

1699

(2)

## Shedford Brick yards

A - Olentangy shale - 16-18 feet of gray, soft shale weathering into lumps and blocks. It <sup>is</sup> what I would call a mudstone. No bedding visible. When dry shows tendency to fissility. Contains small elongate masses of iron-oxide probably formerly was marcasite. Saw no fossils.

B - Encrinur ls. - 20" of limestone in 3 layers. rather granular gray in color and quite granular when weathered. Uppermost layer has green spots suggesting glauconite. This is all through the ls. From the surface of one large block a well rounded quartzite pebble was taken.

*L. meniscella*  
*S. mucronatus*  
*Atypa* - rather small  
*F. submarginatus*  
*E. frimbriata*  
*R. penicillata*  
*N. conicum*  
*Conocardium*

*S. sculptilis*  
*P. rana*  
*Belmontella*  
*P. flabellum*  
*A. decussata*  
*L. perrillana*  
*Taeniozora*  
 A variety of corals.

20"

B

Olentangy  
 16-18'

A

5.

5-2

20



61

July 26'

5

1700

Marsh's Mills -

A - about 2' above level of river end in base of bank about 100 yds downstream is a layer of fossiliferous lenses 1-2" thick abounding fossils. The lenses are composed of sinoidal ls.

Plat. arkensis

Schuchertella

Cyrtina

Chonetes

Arturocanthia

Tentaculites a

Pgr. liata

P. rana

S. micromatus (very wide)

Melocrinus

One lens has the smooth gray cyrtina under it. The fossils are also found 4' above lenses - the big Spizifer

A' - is 4' black or brown (weathered) shale below the Encrinur. Styliolina and Leiorhynchus

A<sup>2</sup> - Calcareous shale about 8" with a marcosite band 6" from base of Encrinur

B - 20" in 3 layers the middle one the thickest

A'

A<sup>2</sup>

Olenite = 29' in all

A = 27'

lenses

2'

River



62

C = 4' of soft shale abounding in corals. This is the coral zone of the Widdow.

D = 1' of brittle dark, brownish gray ls. weathering to a light ash gray. This ls. is like that of the trilobite beds.

Schuchertella      Chonetes  
S. mucronatus      Comarotoechia  
L. laura

E = 5' of fine grained dark gray shale crumbling to thick flakes.

C. boothi      T. bellistriata  
C. scitulus      C. mucronatus

About 3' above D is a calcareous shale with uncompressed L. laura

J - 15"

I - 4'

H - 8-10"

G - 5 1/2'

F = 1'

Section continued 1/2 mile downstream

E = 23'

E - 23' fine crumbly, calcareous shale abounding in S. mucronatus, Huddfordensis, Chonetes, et. al.

D - 1'

F = 1' hard, brittle shaly limestone with dark gray in color with Styholites, Ostracods, S. mucronatus, Patocyclas, C. scitulus

G - 5 1/2' of shale same as F  
H - 8-10" shaly limestone like F with Chonetes, L. laura,

I - 4' shale

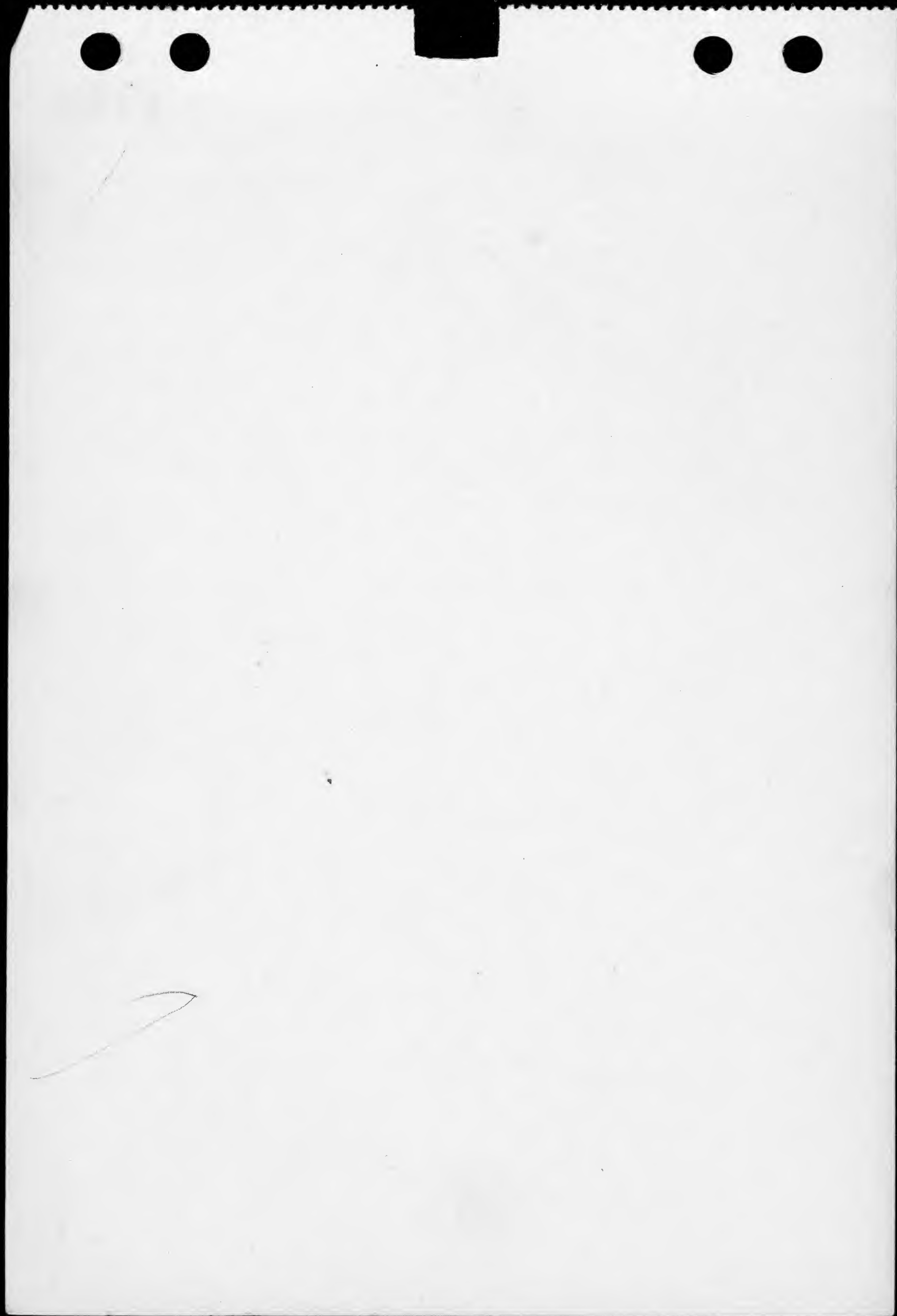
J - 15" of hard shaly limestone



Dark grey in color with **1702**  
 crinoid debris and *Ceratopora* a.  
*L. laura* in great abundance  
 and yields good specimens.

Also *Rhombopora* bryozoans  
 are abundant. *S. muronatus*

The *S. muronatus* *thelphordensis*  
 are from above the coral zone





Notes on the

Devonian

of

Ontario &

Michigan

1934

July 25, 1934

1696

Section in St. Marys Cement Co. Ltd.  
Quarry - This quarry now takes in  
what was the old H. & S. Co. which  
is at the NE. side. The following section  
is taken at the NW corner. The dip here  
is a few degrees to the E.

A - Light, brownish gray massive to thin  
massive limestone, very fine-grained  
Cyprina, C. muricata, small Pteridomella  
Atrypa, S. pinguis, cup coral - 3.2'

B - 2.2' same lithology - Atrypa

C - 1.2' - Same lithology - Chonetes,  
Conocardium, small corals, Atrypa,  
S. hemisphaerica.

D - 1.4' - Same lithology - Cyrtophylidium with  
or in cavities - small cup corals common

E - 11" same light, brownish gray  
limestone. Upper inch or 2 shaly.

F - 8" - Atrypa, Leptæna, Chonetes,  
Leptætophora in same light brown ls.

G - 11" same lithology - corals, Chonetes,  
Atrypa

H - covered 3 1/2' - Crinoidal limestone in heavy beds.

I - 1.5' - Crinoid debris in upper 2"  
Atrypa, Chonetes, Platyceras, same  
lithology as below.

J - 10" - same ls. considerable  
crinoid debris.

K - 2.2' - Lithologically same as  
below. Upper inch shaly.

L - 1.2' - same limestone

M - 1.4' - " " - saw what  
looked like a Paracyclus.

N, O - same limestone

Lawrence

U - 1'
T - 1.4"
S - 1.2"
R - 1"
Q - 3"
P - 1"
O - 8"
N - 8"
M - 1.4"
L - 1.2"
K - 2.2"
J - 10"
I - 1.5"
H - covered 3 1/2'
G - 11"
F - 8"
E - 11"
D - 1.4"
C - 1.2"
B - 2.2'
A - 3.2'



~~11~~

1 2

1

11

4

1

7

6

38

56

11 44"

15

P. - 1 inch brown shale with crinoid debris

1697

Q - 3" smooth gray ls. which has lost its semi-x-ls character and is much darker in color. S. demissa

R - 11" - dark brownish gray ls. very fine grained not semi-x-ls.

S - 1' 2" - 1/2" shale at base - dark brownish gray, fine grained, much oil in stains. Chonetes.

T - 1' 4" - 1/2" ~~shale~~ sandy shale at base brownish gray but not light in color as below the 1" shale bed. Chonetes, Plicidostrophia, Martinia-like Spirifers (small like Cambocelia). 2 shale seams one at base

U - 1' - Chonetes abundant in same lithology as T.

V - 6 1/2" of dark gray fine grained ls. with Chonetes. S. demissa

W - 7" same crowded with Chonetes and Cambocelia like brachs.

X - 1' - brownish gray ls with abundance of Chonetes. X' - 4" same X<sup>2</sup> - 11" same in upper 7" but the lower 4" inches are chocolate colored bituminous shale crowded with Chonetes.

Y - Abounding in Chonetes and large smooth Spirifer - This ls. is dark brown and rather shaly. The lower 3" is light brownish gray

Z - same lower 2" brown shale upper part light brown + gray.

3' 5 1/2"
3' 3 3/8"
Z 14"
Y 1'
X <sup>2</sup> 11"
X' 4"
X 1'
W 7"
V 6 1/2"



6  
3 8  
5 6

1698<sup>3</sup>

31 - 3' 8" in 4. layers (1', 1', 8", 4" 8")

32 - 5' 1/2' to top of quarry in rather  
shaly limestone abounding in  
chonetes. It is light brown in  
color. *Pholidostrophia* common

The chocolate shale in X<sup>2</sup> is the  
1/2 foot layer recorded by Stauffer.  
The contact of Delaware  
Onondaga occurs at about my bed  
P.







The uppermost ls. suggests the *S. granulosa* beds at 7-mile land.

8  
July 27 Stony Pt. 1703  
Ontario

From R.R. station to water level at Stony Point is -93'. Station is 93' above lakes. The lowest bed is 6" of hard, blue gray, coarsely granular ls. In it were seen *Strophomena* and *T. carinata*.

The next bed may be solid or split in halves. It is 1' thick. It is coarsely granular with many green specks & greenish gray in color. Large *Strophomena*, *Pholidostrophia*, fine ribbed *Atrypa*, *Strophomena* 5" or 3" and *Strophomena* 1" thick. The uppermost bed on the beach is 8" thick and abounds in *Pholidostrophia*, *S. demissa*, flat coral and is the most fossiliferous. This bed is dark gray or greenish gray. Has many worm tubes.

See next page.

Fossils seen at Stony Pt. -

- |                                 |                        |    |    |
|---------------------------------|------------------------|----|----|
| <i>Strophomena</i>              | <i>S. demissa</i>      | a  | 3  |
| <i>Atrypa</i> (various)         | <i>S. granulosa</i>    | n. | 23 |
| <i>P. nana</i>                  | <i>P. nana</i>         |    | 3  |
| <i>Strophomena</i> (large)      | <i>C. bowth.</i>       |    | 3  |
| <i>S. small</i> (like Michigan) | Large <i>Rhipid.</i>   |    | 23 |
| <i>Strophomena</i>              | <i>T. carinata</i>     | in |    |
| <i>Strophomena</i>              | <i>S. papulosa</i>     | c  | 13 |
| <i>Strophomena</i>              | <i>Pholidostrophia</i> | a  | 12 |
| <i>Strophomena</i>              | <i>Cystiphyllum</i>    |    | 23 |



Above the bed 3 are several layers of ls. some of which appear to be in place.

1704.

A good deal of our collection came from loose blocks above bed 3. But none of these blocks is far out of place. All of these have the fauna of beds 3 & 4 abounding in *Pholidostrophia*. The weathered upper beds look like the ~~marble~~ but are a little more granular. A.S.W. thinks these big blocks are the bed 3 rolled over or pushed up by the lake. This would make a total of 30". The under surface of the big blocks show large fossils looking like *Orthoplyca*.

This suggests the limestone at the 4 and 7 mile down.

Petrolia sh - 15" of soft shale below the ls. bed 8. *micronatus*.



10 1705

Oppenbach Rock -  
Anticline of fine grained blue gray  
limestone with upper surface  
containing a great deal of black  
cherty fossils

*C. vicinus* or

*C. brotteri*

*Cyrtina*

*S. mucronatus* or

*S. denysii*

*L. plana*

This rock is lithologically unlike  
that at Stony Point and undoubtedly  
overlies it.



1706

July 28

Maumet River 4 miles N of Auburn  
granular or semi-cryst.  
13 feet of grey buff. ls. with corals,  
sponges, *Strophomena*, *Pholidops*,  
*Light donella*.

On top of this is 6" dark grey ls. with  
*P. linearis*, change in lithology is striking

Locality 2 1/2 mi N. of Farmosa

Detroit River - yellow or buff  
dolomite, 3-4' exposed.

Onondaga - lower surface very  
irregular, basal bed gray granular  
ls. about 3 1/2" thick - 7" thick. This  
is followed by the main mass  
consisting of broken corals,  
sponges, shells and ls.  
forming the matrix. It is light  
gray in color and cracks on  
weathering to plates and lumps.  
Fossils are often hollow. Many  
mineral-filled hollows in the  
mass. In lowest 5' *Conocardium*  
is abundant.



Fossils -

12

1707

July 28

Godenich

A - Silurian rocks 5'5"

B - Lowest layer of Onondaga has pebbles and fairly large ones of the Silurian belt. The contact is irregular. The uppermost 2' of the Silurian are rather rotten and weathered. The lower part of Onondaga is grey, light to dark and granular. It's next 3 1/2' are fine grained granular with small pockets of yellow dolomite & ls. scattered corals & brachiopods here. 2nd step is fine-granular, bituminous shelling ls.

The ls. is quite uniform throughout the mass but on the top of the cliff where I measured it there is a foot of rather smooth, fine-grained dark brownish grey ls. The contrast in lithology is quite striking.

C - Dela.

The Onondaga contains many brown, anastomosing bituminous lines. The Delaware / abundant in a small fine bed of *Atrypa* such as is common in N.Y.

B

0  
1  
0  
1  
d  
a  
g  
a

32'6"

Silurian

5'5" A

River level



July 29 / 13

1708

L. laura umbonata in coral bed.

# Section at Rock Glen.

A - Engrailed bed is 17 inches.  
 A' - black shale of 2"  
 A<sup>2</sup> - shaly ls. 6" gray & blue ls.  
 I would call the base of the Engrailed at the top of the thin black shale layer. The latter and the shaly ls. beds - it seems to me to go better with the Olenotrochus.

B - coral bed here is 2' 8" thick, thinner than elsewhere. It is blue gray calcareous shale abounding in corals etc.

Send Mr. Southworth my Microcyclus.  
Microcyclus is unknown in coral bed.  
Eleutherozoon occurs in coral bed.

C - Widdow beds - 18" of brittle shaly limestone very much like some Leda like beds.

C. scitulus                      L. laura a.  
 A. umbonata                  Philiclostrophia

E 1'-15"

D - Calcareous, crumbly dark gray shale weathering light bluish - 15' 3"

C. scitulus                      L. laura  
 S. thedfordensis              C. boothi  
 S. thedfordensis is abundant near top.

18"

C

coral bed

B

E - 1' - 15" of hard shaly ls. brittle passing into the shale below. It contains S. thedfordensis.

A

A<sup>1</sup>  
 A<sup>2</sup>

F 8' calcareous sh with a hard band of about 1' thickness at 5' up. S. thedfordensis abundant here.



G— 20" of hard shaly and brittle limestone containing much debris, probably of blastoids. *L. laura* *S. mucronatus*. The fauna now known from the pit just N. of the R.R. cut comes from just below this bed. To E. this is the *L. laura* bed.

H— 2' or so — The exact thickness was impossible to determine.

<i>Ceratopora</i> s.	<i>Tenestellids</i>
Cinoidal debris	<i>C. indenta</i>
<i>Sp. Thedfordensis</i>	<i>Schuchertella</i>
<i>Chonetes</i>	<i>Atypus</i>
<i>L. laura</i>	

I— 37" — shaly brittle dark gray ls. with *Ceratopora*.  
*S. Thedfordensis* *P. rana*  
*L. laura* *S. densa*

The *Tornoceras* occurs in bed C



loc

35

July 31.

16 1710

## Section at S end of Partridge Pt.

A - Crinoidal ls. at bench level about 8" - 1' in thickness. They are greenish blue-grey in color - bands containing pockets and partings of shale.  
*Bygonia* c.

B - covered - 6" - 1'.

C - knobby limestones with shale, fossils abundant - There is where crinoids, blastoids & corals are abundant about 6" thick. Shale most abundant in lower 3'.

~~D - 1' 10" - 2' knobby crinoidal ls. with some fossils as below but much less shale.~~  
 D - 1' 10" - 2' knobby crinoidal ls. with some fossils as below but much less shale.  
 E - smooth dark grey ls. with very little crinoidal debris resting on D with uneven surface.  
 This has *Hemalonia* sp.  
*C. boothi* *Camerothecia*  
*Pholidostrophia*

2-3 1/4

E

E

1' 10"

~~2 1/2~~

D - 1' 10" - 2' knobby crinoidal ls. with some fossils as below but much less shale.

6'

C

6" - 1'

8"

A

E - smooth dark grey ls. with very little crinoidal debris resting on D with uneven surface.  
 This has *Hemalonia* sp.  
*C. boothi* *Camerothecia*  
*Pholidostrophia*

Below A there is an interval covered interval of some 6" of sandy ss. and below that crinoidal ls. fossils are not common either. A.S.W. thinks there actually may be no covered interval.  
 This is Verbeke's 1 + 2 of p. 15B.



Aug 17.11

Take of Woods Og of Kelly Island  
Lime + Transport Co. N.E. 1/4, 33 N, 8 E

Many face 30' high at highest  
point. Represents beds very near  
the top, probably within 20' of top.  
The rock is mostly a dark  
brownish gray, finely-bedded ls.  
weathering buff in section but  
ash gray on the surface. Very  
bituminous. Fossils are not  
abundant.

Cystiphyllum	3 kinds of Atrypa
Favosites	Enomophoria
Acervularia	E. lutea?
Eypichula	Rhytidoceras?
Rad. elliptica	

A little Bell shale occurs in  
pockets in the rock.

Aug. 2.

Section at Rockport Og - 38

Bell shale - This is soft blue, clay  
shale or mudstone abounding in  
fossils - *Bellerophon*, *Chonetes* cf.  
*acornatus*, *Cameroecchia* aff. *huxfordi*  
or *prolifera*. *Tentaculites*, *Strophodont*  
2 sp. near *S. demissa*, *S. mucronatus*  
like *S. m. thedfordensis*, *Pholidostrophia*  
*genaeoceras*? a.

Rockport ls - Lower 8" is limy shale  
abounding in fossils -

<i>Athyris</i>	<i>Acervularia</i> c
<i>Nucleoceras</i>	<i>Stromatopora</i> a
<i>Elytha</i>	<i>Favosites</i> ~
<i>Spirifer mucronatus</i>	
sp. aff. <i>andaculus</i>	
<i>Strophodont</i> ("demissa")	
<i>Atrypa</i> like <i>A. devoniana</i> a	



The next 30' of the Rockport are composed of thin bedded ls. with many black shale partings and many large brachs of *Stromatopora* *Prigotale Favosites* a.

The upper 10-13' are buff, light ls. fine grained with few fossils. See Ver Wiebe's section.

8-6" ls. seen in 1936 & 37

- 6" 34"
- 3 1/4'
- 8"
- 2'
- 14"
- 2 1/2'
- 10' 38E
- 10-13' 38C+D
- 38C+D 27' Ver Wiebe section
- 13' Bell sh.

E - 10' of soft calcareous ls. with lenses and beds of ls. Very fossiliferous.  
C. alpenensis      Atrypa c.  
Atrypa large a      Strophodonta dentata  
K=38F Pentamerella large      b. concava-type  
Lorals      Pholidostrophia  
J Acervularia 2 sp. a.      Schuchertella  
D Sp. mucronatus      Schizophoria  
H Sp off andaculus

G  
F=38F  
F - Blue gray semi-xls ls. with corals, Acervularia, Pentamerella (large) Fenestella, Sp. mucronatus  
G - 14" blue sh with Fenestellids, Camerotoechia (small), Sp. mucronatus, Cystina hamiltonensis, large Atrypa.  
D These fossils are in very top of F = Camerotoechia zone  
H - Hard, heavy bed of grey ls with big Atrypa and big Pentamerella

I - 8" blue sh with Schizophoria, Atrypa, Acervularia

B=38b J - same as H  
A=38a  
K - blue shales with small coarse-bedded Strophodonta. Stromatopora is rare above C in the Rockport ls. The Bell suggests Shufang by position but the faunas seem to be quite unlike

over

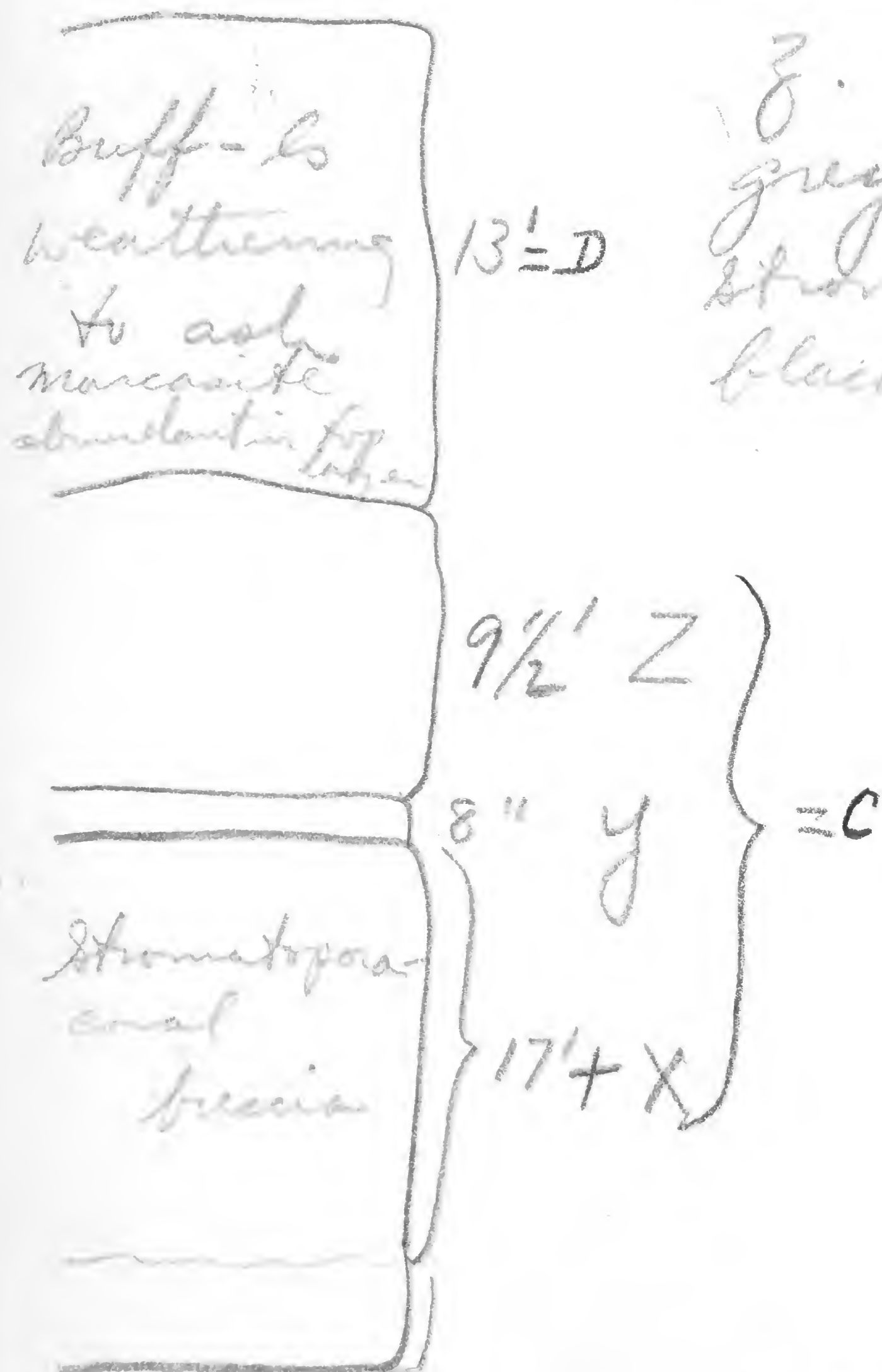


# Rockport ls. (C+D of previous section)

X - Dark brown grey ls. largely composed of fragmented *Stromatopora* + corals. Thin irregular black sh seams wrap around corals + *Stromatopora*

Y - 8" black sh with large *Acervularia*

Z. Black or dark brown grey ls. with very few *Stromatopora* + corals. Much black shale in thin seams.



Aug 2'  
Along quarry R.R. 4 mi. N of the Rockport + Ay is a small outcrop of Bell shale with *Acervularia*, bryozoa,



1713

19

Petkeys Pt.

Aug. 3

Loc 39

About 2' of uppermost Dundee  
 brownish grey and anticline.  
 This is  $\frac{1}{4}$  -  $\frac{1}{2}$  mile north on the shore  
 of the crusher of the Rockport Dy.  
 The rock is brittle brown grey ls.  
 with a little granular or ~~fine~~  
 crinoidal ls of a lighter color. Fossils  
 Schizophoria Cystodonta  
 6 smalls Strophomena  
 Symplesma Atrypa  
 S. linearis.

Aug. 4 51

Abandoned Dy of Alpena Portland  
 Cement Co, SE  $\frac{1}{4}$  Sec 18, T 32 N, R. 9 E  
 Middle Long Lake

A - 2-3' of greenish blue shale with  
 abundant brachiopods, small Syntrochus,  
 Schizophoria, big Strophomena, S. linearis,  
 Schizophoria linearis.

The upper few inches are in platy  
 semi-crinoidal ls. with some fossils.  
 The lower part of shale occurs laminar  
 and a few other fossils are present.

B - soft shale with thin layers or  
 lenses of shell tuffaceous, also the  
 shale C. aff. coronatus is very  
 abundant. Together with S. linearis  
 & S. coronatus. In the ls. occur  
 large Symplesma, Cystodonta, Brachyopoda  
 & some brachiopods.

36-40' per mile  
 Regional dip S 30 W



70

1714

C - One foot of limestone - earthy, grey color, semi-granular

D - 7 1/2' of shale, mostly covered, got no fossils from it

4 1/2' G

7' F

15" E

7 1/2' D

E - 15" of limestone, dirty gray with large *Spizella*, large *Atrypa*

1" C

24' ± B

F - 7' of shale and thin beds of ls. alternating -

*H. vaningeri*

*Protodactylopusia*

*Big Schizophoria*

*Huge Atrypa*

*Big Spizella (granular)*

*Productella*

3' ± A

G - 4 1/2' of limestone, heavy-bedded, with basal bed of two feet separated from



upper bed by 1 foot of shale

The lower part of the section  
to D has very few *Atrypas* but  
the upper part has them in  
abundance. This section is  
stratigraphically not far above  
the top of the Rockport Qy.

V<sup>1</sup>

Aug 5

1715

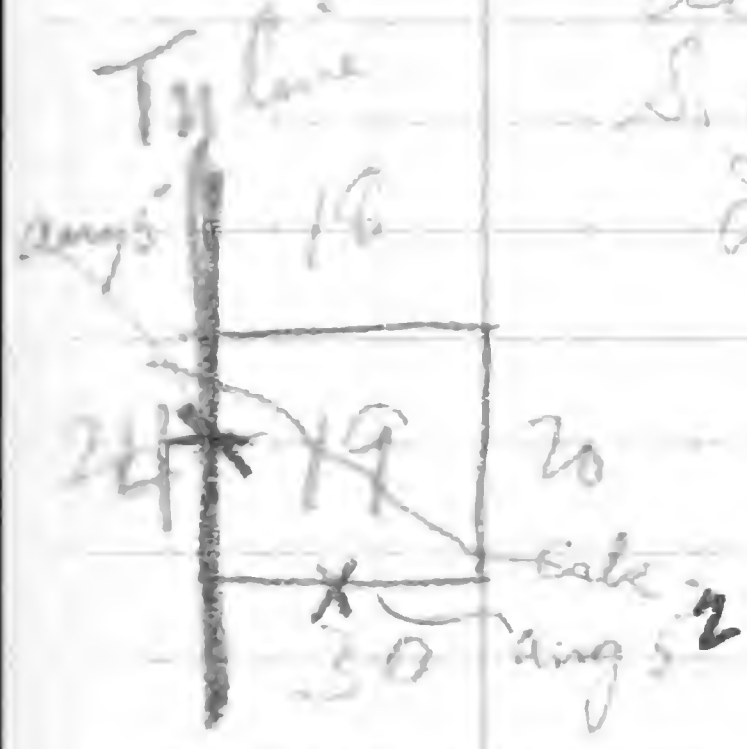
Aug. 5 - NW corner sect. 19, 32 N, 9 E.  
about .2 mile S of Long Lake Creek  
(Hell Creek). 2 thin grey ls. now x<sup>en</sup>  
ls. corresponding to bed G of the  
Alpena Portland Cement Co. Q.  
These beds were seen along the  
road just east of the Benshaw  
shovel to the next section line E.  
This section is between sections 19  
and 24.

Aug 5<sup>o</sup> .2 mile still farther north is a third  
thin ls. which is quite conoidal this  
differing from the two below. These ls.  
hold up a high ridge and flat.

Aug 5<sup>a</sup> This thin ls. is well exposed .4 miles  
east of the section line. Here fossils are  
common. The ls. is about 2' thick.

<i>Productella</i>	<i>Pholidopteria</i>
<i>D. romingeri</i>	<i>Pterinea</i>
<i>Big Atrypa</i>	<i>big Spirifer</i>
<i>Acroculina</i>	<i>favosites</i>
<i>S. ducroyi</i>	

This bed is 5-10' above G.



This is uppermost  
Benshaw

Aug 5<sup>2</sup> - corner SE 1/4  
Sec 30 32 N, 9 E - 1 foot +  
of pinkish conoidal ls. with  
*Stromatopora*, *big Spirifer*, *big*  
*Atrypa* + *big Athyris*. This must  
be at least 20' above Aug 5' ls.  
*big Spirifer* has no furrow in fold.

Aug 5<sup>3</sup> 0.85 mi. E on same road  
(SE cor SW 1/4) about 3' conoidal ls.  
Spec 29, 32 N, 9 E. Contains abundant  
*Stromatopora* + *Acroculina*.  
This is the upper fly ls. above  
the 2 ls. The distance between the

This is  
apparently  
fly





two limestones is about 2'.

✓✓

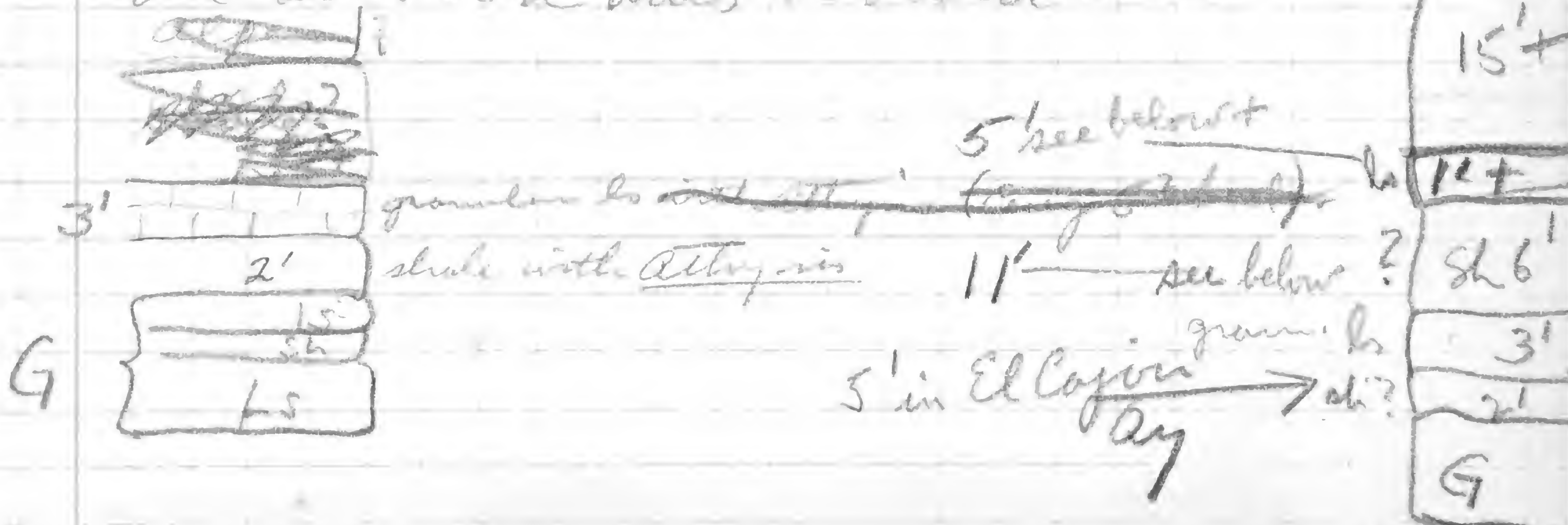
Aug 5<sup>4</sup> - South Mine - **1716** - Rockport ls. probably middle.

Aug 5<sup>5</sup> - ~~South Mine~~ <sup>Center S line sec 25</sup> 32 N, 8 E  
Center S line of SE 1/4 sec. 25, 32 N, 8 E.  
Grey fine grained ls. <sup>with many small</sup> of the lower  
Alpena. Rock slopes gently upward  
to the east, probably the dip slope  
of the rounded ls. of Aug 5<sup>2</sup>. There are  
15' + between Aug 5<sup>2</sup> & Aug 5<sup>5</sup>. Fossils  
are scarce in the Aug 5<sup>5</sup> ls  
consisting of a small coarse ribbed  
Strophodonta, ball-like Foronites,  
digitate foronites, Acervularia,  
Sp. angustatus, small Pentamerella.  
These fossils were seen in the lowest  
5' + of rock exposed.

SW 1/4 NW 1/4 sec 23, 32 N, 8 E

Aug 5<sup>6</sup> - Under bridge over Long Lake  
Creek on Long Lake rd - 15' of ls +  
shaly ls dipping E about 10°. At  
top ~~of section~~ at all down are large  
Atthyris, Atthyris, small Strophodonta  
which belong at top of section  
(probably). This sequence probably  
fits with semi x ls. above (?) above  
G bed of A.P.G. Co. Ar. The Atthyris  
bearing shale probably fits between  
the Upper G bed & the x ls. ls.

The section thus would be





23

Aug 57 — Along Alpena - Long Lake Road about 13/4 mi. N of Town Hall base of black Alpena. Along west line of NW 1/4 sec. 26, 32 N. 8 E about 1/5 mi. S of N line of section. (1/5 mi. S of NW corner to be more precise. Killians)

A5<sup>8</sup> — patch of upper Long Lake in rd. and on E side road in dirt are silicified *Athyra*, *Cyrtina*, *S. demissa* small. This is same as upper beds at A5<sup>6</sup>.

A5<sup>9</sup> — 15' — above A5<sup>8</sup> is exposure of black Alpena probably the base. There are 21' of this black ls.

A5<sup>10</sup> — Rather dark gray, semi-crinoidal ls. weathering brown but along bedding

<i>C. coronatus</i>	<i>S. coronatus</i>
<i>Pholidostrophia</i>	<i>Pterinea</i>
Large <i>Spirifer</i>	No <i>Athyra</i>

This is typical Alpena and is clearly the basal layer. *C. coronatus* was seen in Alpena just above the Killians on the Long Lake road.



v3a.

Aug 6<sup>1</sup>

1718

NE corner SW 1/2 sec 15, 32 N, 8 E.

On shore of lake, poor exposure, about 2' ls., then 8" shale followed by about 1" ls. all with *Athyris*, about 0.1 mile S on W side road is small exposure of granular ls. with *G. romingeri*, *D. mucronatus*, + large *Athyris*. This section is thought to be about the same as at El Cajon. The thickness of the granular ls. must be about 3'. The granular ls. dips N toward the lake.

Aug 6<sup>2</sup>

0.3 miles S of Aug 6<sup>1</sup> - same granular ls. also capped bed at A 6', here it is nearly flat forming the crest of a gentle dome.

Aug 6<sup>3</sup>

Center NE 1/4 sec 22, 32 N, 8 E.

A - On a small gully and along S side of road in ditch. - On lower granular or top of El Cajon section is exposed in gully, 3' dips N.

C - 5'

B - 11'

A - 3'

B - Shaly calcareous bed with *G. romingeri*, *Stenotrophium* (type loc.), in lower 2'. Higher comes *Schuchertella*, big *Schizophoria*, big *Spinifer*, *Athyris*, *Cyrtina*.

C - dark, gray fine grained ls. with big silicified *Athyris*, *D. mucronatus*, *Acervularia*, *Pholidops*, *Athyris*, *Productella*, big *Spinifer*, *Cyrtina*.



24

Aug 64

1719

About 1/2 mi. N of Alpena - Long  
Lake road in the direction with one  
to Long Lake Lodge - outcrops of  
same bed as C at A63.

Aug 65

Rabitan  
Farm

0.85 mi. N of Presque Isles - Alpena  
Co. line on road to Rockport  
just N of sec 2, T32N, 8E.  
4' calcareous shale with a 6"  
limy bed. *B. rommigei* C, big  
*Atrypa*, big *Spinifer*, *P. tenuis*,  
*S. remissa* (7 kinds), big *Schizophoria*,  
*Athyris*, *Cyrtina*, small encrinurals

Suggests bed F of APC co. On  
this road exposures of Rabitan  
Farm of Oriskany.

Aug 66

See A63 + A64 - On sec. line 0.1 mi. S  
of NW corner sec 25, 32N, 8E.

Crinoidal ls. poorly exposed  
in ditch with *Adenoidia* +  
*Stromatopora* - basal Summerville  
ls.

A67

0.2 mile S. of A66 about 1-2' of  
dark gray ls. with large *Gypidula*,  
*Cyrt. alpehensis*, large *Atrypa*, *S.*  
*macronatus*. This is uppermost  
Summerville.

A68 -

Base of black Alpena (Killbuck  
ls.)



Aug 7.

1720

25

Recheck on section S of Long Lake Lodge

Sect  $\frac{3}{4}$  mi

S of Long Lake in large Atropa in the lower part of Lodge but with *Cyt. alpenensis* in the *Cyrtina alpenensis* zone top. *Spiromatopora* and *Accumbens*

latter lake

9'  $\pm$  ls

Atropa

accumbens - Strom

8' - limy B sh

cupressata

3' grey ls. A

C - This bed is gray ls. abounding in large *Atropa* in the lower part but with *Cyt. alpenensis* in the *Cyrtina alpenensis* zone top. *Spiromatopora* and *Accumbens* are in the lower part. The top of C. is about 10' below the black Alpena ls.

C The B. beds must certainly be the 5' interval at the top of the El Cajon Anom. I am not sure if A belongs to our St. or to what we called the "lower granular". See *Cyt. alpenensis* zone here is equivalent to the C. alp. zone on the W. side of where lower ls. it is 10' below black Alpena

The two beds at the Long Lake Lodge may belong actually to our 3' of ls below the bridge or the A of the section  $\frac{3}{4}$  mi. S of Long Lake Lodge, and may be equivalent to the lowest beds at El Cajon or the upper ones at A P. Cay. The lowest beds at Long Lake Lodge are 3' above Lake level.

Section at Long Lake Lodge

ls same as above

covered ?

ls with atropa covered sh 2'

ls 2' with

This is thought to be our lower granular. This is probably A of the above sect. This would be upper B.



# Long Lake Series



Top Rockport Qy 17' above Rockport.

89

76

At Killians (C. & Lewis S. of intersection)  
 the Alpena was seen loose  
 and ~~about~~ with our ls. 9' thick.  
 this would put the ls. about  
 6-8' below the black Alpena. This  
 is more in keeping with the  
 usual road section where my  
 10' between the two is certainly  
 excessive. Here 8' is about right.

A7'

Basal, Summerville ls. with  
 Stromatopora & Acervularia



A 72

27

Fletcher or Boony Co. dam  
Norway Point Dam

Section on N side of river - here  
heavy bedded ls. are brought out  
of the river by an anticline, possibly  
a reef below. 6'

A - heavy bedded rather light  
brownish gray ls. abounding in  
fossils -  
Pholids a S. demissa c  
Camarotoechia c C. cornutus  
Cystina Stroph. concava  
S. granulosa S. mucronatus

B - 1' nodular, irregularly bedded  
calcareous (?) sandstone of very fine  
grain. The irregular nodules are  
calcareous.



C - ~~shaly~~ sandy shales with thin  
calcareous nodular beds. fossils  
rare -

Small Cystina	Small fine-lined Stroph.
Pterinea (Cornellites)	Acrotoma at base
S. granulosa	Fish " "
Chonetes cornutus	S. demissa

The heavy blocks of C have Artus-  
physa-like markings & rain-drop  
impressions



A72 cont'd.  
Section on 8 side 1723

28

Thunder Bay River at Fletcher  
dam. or Norway Point dam

47

A - cherty nodular & abounding  
in fossils:

*Cyrtina* 3290

*S. denisea* (fine)

Petermann's

*Cypharus a*

Phacelia

Small Petz

*S. granulosa* b

*C. crenatigula*

*C. coronatus* n.

Byzova

P. J. Schellman

These beds suggest the Pleurodictyon  
zone of Lake Erie

34

clay B - soft shale nearly barren of macro fossils.

10-

B C - grey siltstone or fine sand-  
stone with  
*P. aff. constricta* *O. undulata*  
*H. deparvi* ?

211

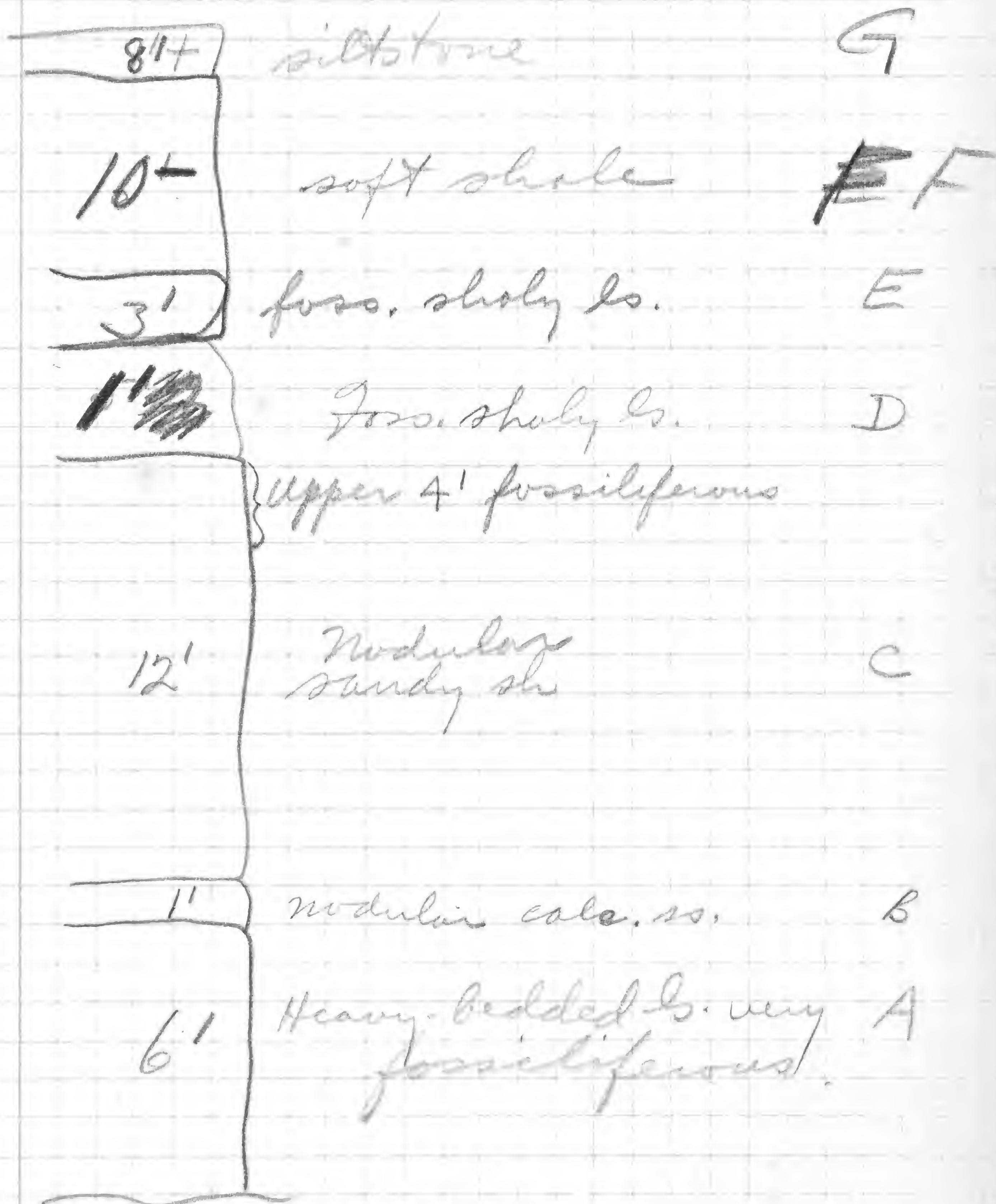
A - D -

The beds on the south side of the river are nearly flat, but the ones in the anticline dip steeply.

According to H.S.W. there are 12' of the C beds on the N side of the River & above this 13' of fossiliferous shaly ls. with <sup>these "corymboid" bryozoans</sup> ~~abundant~~ <sup>few</sup>. Then comes the section of the south side of the river.



29

Composite section at  
Fletcher Dam

These layers are strongly  
folded & dip 30° from the dam  
where we measured them



A73

1725

Section at 4-mile Dam

141  
30Section made at 5/3 of  
dam running S 20 E -

6' F soft blue shale

2' E - sandy, grey limestone with  
sp. micronatus.3' D Soft blue <sup>clay</sup> shale - basal 6"  
with sp. granulosa, & Cyrtina

1' C. - Rather hard sandy ls with Cyrtina

Noddy sand, calcareous shale  
with Cladopora, Cyrtina, Bryozoa  
fine ribbed Atrypa, Planoceras in  
lower 2'.9' B This bed may correlate with  
C of Fletcher dam, but I doubt  
it.Massive reef ls. with large  
coral heads, Atrypa, crinoid debris

7 1/2' A

Note - At first we thought C  
belonged to upper C of dam. We went  
thru rockier dip S 20 E strongly  
when we measured it.



31

Aug 8  
SE 1/4 Sec 019, 31N, 8E.

1726

Loc  
37

Series of thin impure dark  
separated by thicker layers of shale all  
thickening about 4-5'. Large bands of  
Favosites & Stromatopora and abundant  
Also Conocardium (like annularis), small  
Athyra & small S. denissa. Near top of  
Shindler Bay 20-25' below Partridge Pt.  
beds.

Aug. 8<sup>1</sup>

1/2 mile east of Aug 8. 2' of impure  
irregularly bedded dark gray ls. with  
Cylindrophyllum, Favosites, Athya, small  
Athyra.

Aug 8<sup>2</sup>

SE 1/4 Sec 20, 31N, 8E.

Robber farm - starting at city limits  
on Hwy 2348. And going W on Highway  
A - in ditch calcareous nodular silty  
rocks for 1' followed by hard irregularly  
bedded dark gray ls. weathering brown  
(B). Actually bed A is a composite of  
about 6" limestone, then 6" shaly rock  
where fossils are common.

Club-shaped stromatopora, favosites,  
corals, Strophomena, Cyrtina alpenensis,  
small S. denissa (coarse-ritted), also  
Conocardium

B - is 2' of limestone which dips 2-3° east.  
hence in land levelling we go up  
dip, at least for a time.

1st HL = 66 paces. 2HL = 34 paces

At the top of 2HL is about 1'  
of gray ls. in the ditch which I  
take to be the same as B. It  
has stromatopora and corals.

3HL = 40 paces and then comes at the  
crest of the first rise. This exposure  
extends for 60 paces beyond 3HL  
to the west.

Probably 3' here.

Section at  
city line





3V

At the middle of the exposure there is a dip of about  $1\frac{1}{2}^{\circ}$  to the SE. At the W. end of the exposure the dip is  $1\frac{1}{2}^{\circ}$  to the west. The crest of the rise is about 50 paces west of 3 H.L. Then the west limb of the antiform descends under the next rise. 4 H.L. = 168 paces. From 60-168 is covered and down covered dip slope of B.

5 H.L. = 104 paces - all covered

6 H.L. = 55 " " " " - at

~~7 H.L.~~ = top 1' limestone poorly exposed with digitate favosites

7 H.L. - 32 paces - base forms a low bench at top of 6 H.L. - ls. poorly exposed on slope by terrace formed by 7 H.L.

8 H.L. - 62 paces - top exposed 2' of limestone

9 H.L. - 50 paces - this is very top of high terrace and from here westward there is a long gentle west slope for  $\frac{1}{2}$  mile or more. The top of 8 H.L. is flat ls. crowded with broken corals but as one rises to the top of 9 H.L. the dip apparently steepens to the east so that one walks up the slope of the 8 H.L. bed. I therefore doubt if there can be more than 25' of ls. exposed between 3 H.L. + 9 H.L. if that much.

From top of 6 H.L. to 9 H.L. there is continuous ls. but from 3 H.L. to 6 H.L. it is mostly covered. Perhaps this is a shale interval.

On the field N of the road about  $\frac{1}{3}$  the distance between 3 H.L. and 6 H.L. is a patch of the B. ls. which undulates. This certainly restricts the thickness of the next ls. that above B to probably about 10' and there is very likely little shale there. The fossils at the city limit come from shale







34

# Section at El Cajon Beach

49

1729

A - Probably ~~type~~ of my b. beds of A.P.C. Bay.

B. Bryozoa, Productella, large Schizophylia, Pterinea, Pholops, Pholidostrophia

C. Productella c, S. mucronatus, Pterinea, big Atrypa, Gonophylia, Pholidostrophia, Schizophylia, Small S. denisiana, Productus. Top b. bed.

semi 8" granular

E 8"

D - Schizophylia, S. romingeri, S. mucronatus, big Sphurifer, big Atrypa (rare), Pholidostrophia, Productella, Cyrtina no. sp., Phacops, Atrypis.

5' Calc. sh

D

2' Shaly ls.

C

E - probably over lower granular - Big Atrypa, Pholidostrophia, S. romingeri, cup corals, S. mucronatus, small S. denisiana, Cyrtina, Productella.

11" shaly

B

6"

A





$$\begin{array}{r} 450 \\ 2 \\ \hline 900 \\ 150 \\ \hline 1050' \\ 16'' \end{array}$$

30' per mile

1400

7282

35

Aug 10.

Partridge Point -

1730

to small Pt.

Dip on P.P. beds  
is about 30' per mile.

South east along strike of  
rocks 200 paces from southern  
on S.E. end of Partridge Pt  
appears to be basal  
limestones of the P.P. exposure.  
Then go about due south  
450 paces which is a little  
oblique to the dip to the body of  
a narrow point which carries  
the upper blastoid beds.

100 paces ~~to the~~ SE to the tip  
of the point. This point produced  
about due SE would bisect  
Sulphur Island. The strike of the  
beds on the tip of this point  
would bring them on the S end  
of Sulphur Island but they  
appear to plunge under the  
island. There are upper blue dense ls.

Going SW directly down dip  
107 paces brings the Goniolite beds  
dolomite blocks 6" thick appear  
scattered about. At 212 paces they  
are definitely in place. At  
about 600 paces the ~~the~~ thick  
blocks of dolomite disappear  
and smaller slabs with goniolite  
appear. The inlet just S. of the  
fast point has a low elevation  
made up of the thick dolomites  
which range from 6" to 1' in  
thickness. Since the point is made  
up of upper P.P. there could be  
(with dip of 30' per mile) about  
6' of beds between upper P.P. and  
the Goniolite bed. But there are  
at least 2' of upper P.P. which  
make about 4' between upper P.P.  
and Goniolite.

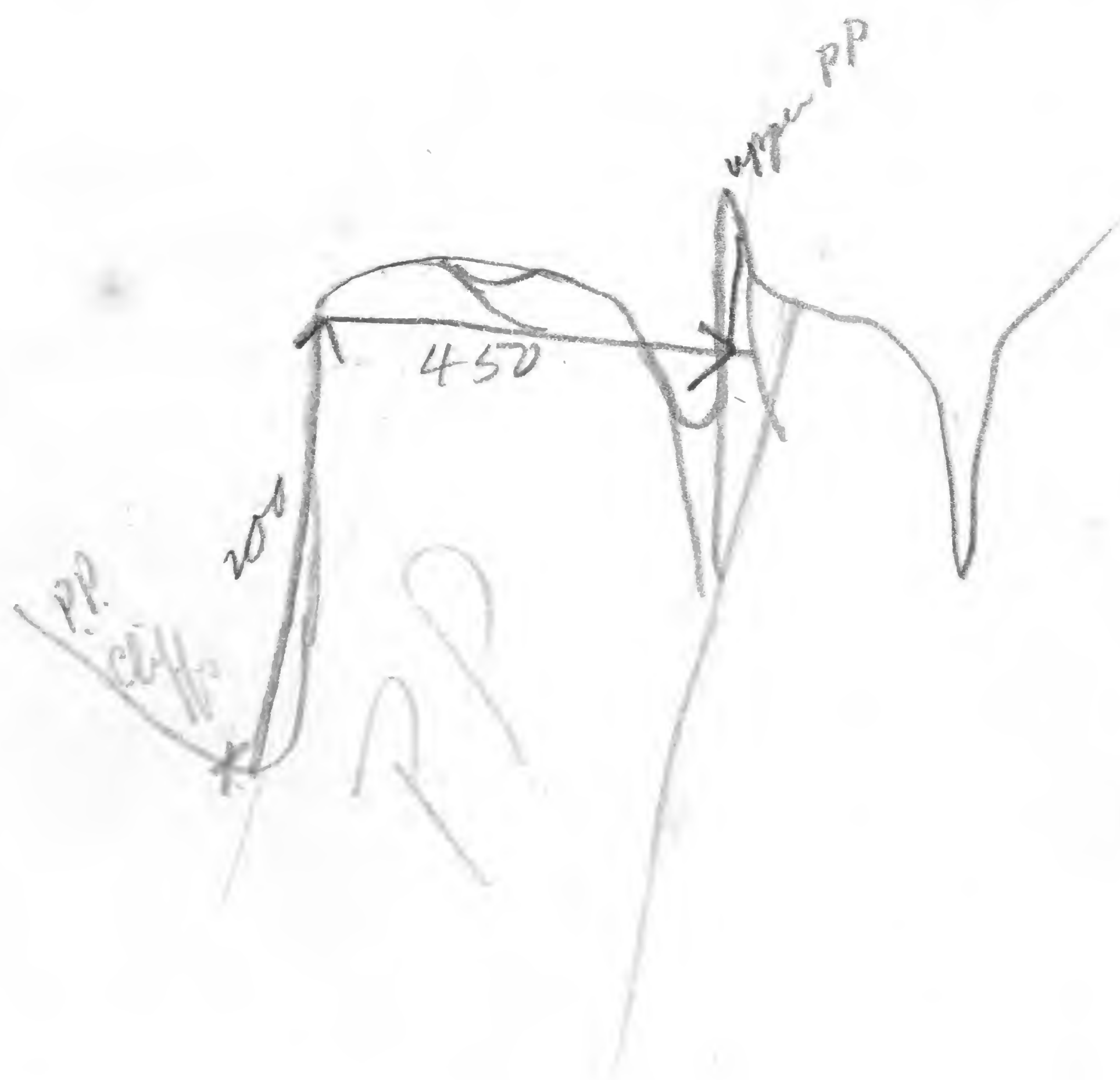
The Goniolite bed is exposed

from Pt  
with contact  
of P.P. &  
upper P.P.





(SI)



36

for fully  $\frac{1}{2}$  mile w on the beach. Apparently 1' or less of dolomite comes in on top of the Goniolite bed. In the beach the bed (Goniolite) appears to be flat. I suspect the Goniolite bed is very close under the black shale.

Handbook of Bryozoa  
for Andrew McWain

There should be unconformity between upper Palaeozoic and upper P.P. beds. However contact was not seen.



Aug 11.

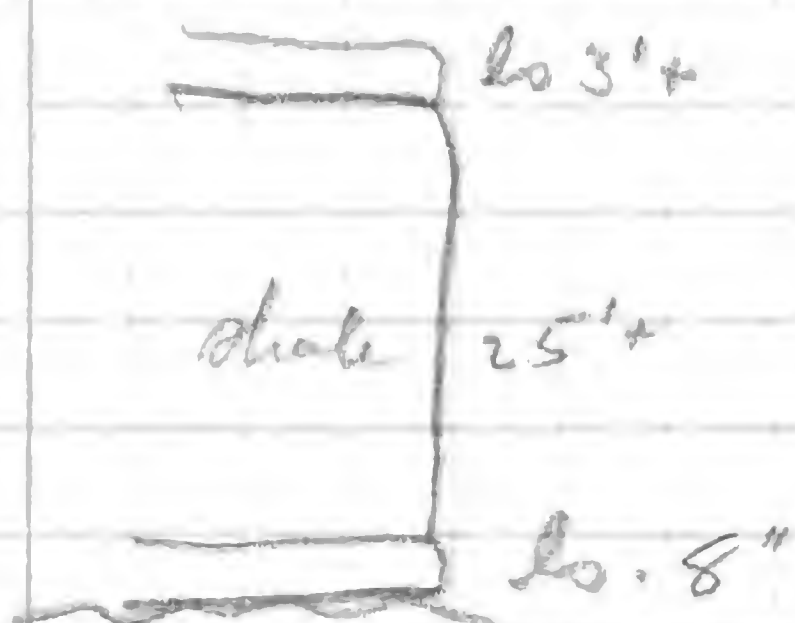
1732

37

Fossils seen in top of lowest  
self bed at Fletcher dam are  
*Leptamerella* small      fine-lined *Atrypa*  
*S. mucronatus*      *Camarotoechia*  
*Cyrt. alpinensis*      *S. granulosa*

Loc 46

Section on Thunder Bay R  
about  $\frac{3}{4}$  mile downstream from  
Fletcher dam - Above 8" of limestone  
thought to be the uppermost one  
under the clay at the dam  
comes 25' + of blue shale  
with *Chonetes*, *S. tenuis*,  
*S. granulosa*, *Cyrtina* sp.,  
*S. mucronatus*. This is  
thought to be the same as  
the uppermost shale at  
the Fletcher dam.





Loc 40 Alpena Limestone in quarry  
of Michigan Alkali Co.

38

At the base of the quarry are about 10-12' of dark gray to greenish brown shaly limestone, mostly corals and Stromatopora. Some of the beds are quite thin. These were seen.

Small Conocardium

Acantharia

Strophomena

Favosites

Sclerophoria (small)

Botryllus socialis

Above this is a bed of dark petrolierous limestone containing Calymene. This is 20 feet thick.

At the ledge of the first level in the quarry below the top are 3' of shale abounding in Strophomena. This is about 30 or 35 feet below the top of the quarry.

Some 15-20' below the top there is an abundance of white siliceous material.

At the top of the quarry there are 2' + of blue shale like that at the Thunder Bay Co. This very likely corresponds to the top of the latter quarry.

At Thunder Bay Co. there are 8' of blue fossiliferous shale about the top of the quarry capped by about 8' of limestone.



Top Killians Exposure roughly 39  
50' over lake

Aug. 13. Loc

1734

Upper Dundee with large  
andily, Acervularia, Alveolites  
Favosites, Phillipsastrea

Aug. 14 -

# Section at Killians

Above the Summerville ls. there are  
(B) - 7 feet of dark, calcareous shale  
abounding in fossils: - *Cyrt. alpenensis*,  
*Eypidula* sp. *winingeri*, *S. aff. Lemmon*,  
*S. mucronatus* (large), large *Athyris*,  
wide-linged *Productella*, large *Atrypa*

C - On top of the shale is a layer of  
dark gray ls. 8" to 1' thick containing  
fossils like those in B. below it -  
Here the large *Eypidula* is very  
abundant together with *S. mucronatus*,  
large *Atrypa*. The large *Eypidula*  
is very abundant at the very  
top where black shale appears

Black  
Killians

D

limestone

20'±

C

very dark

B

gray shale

Summerville

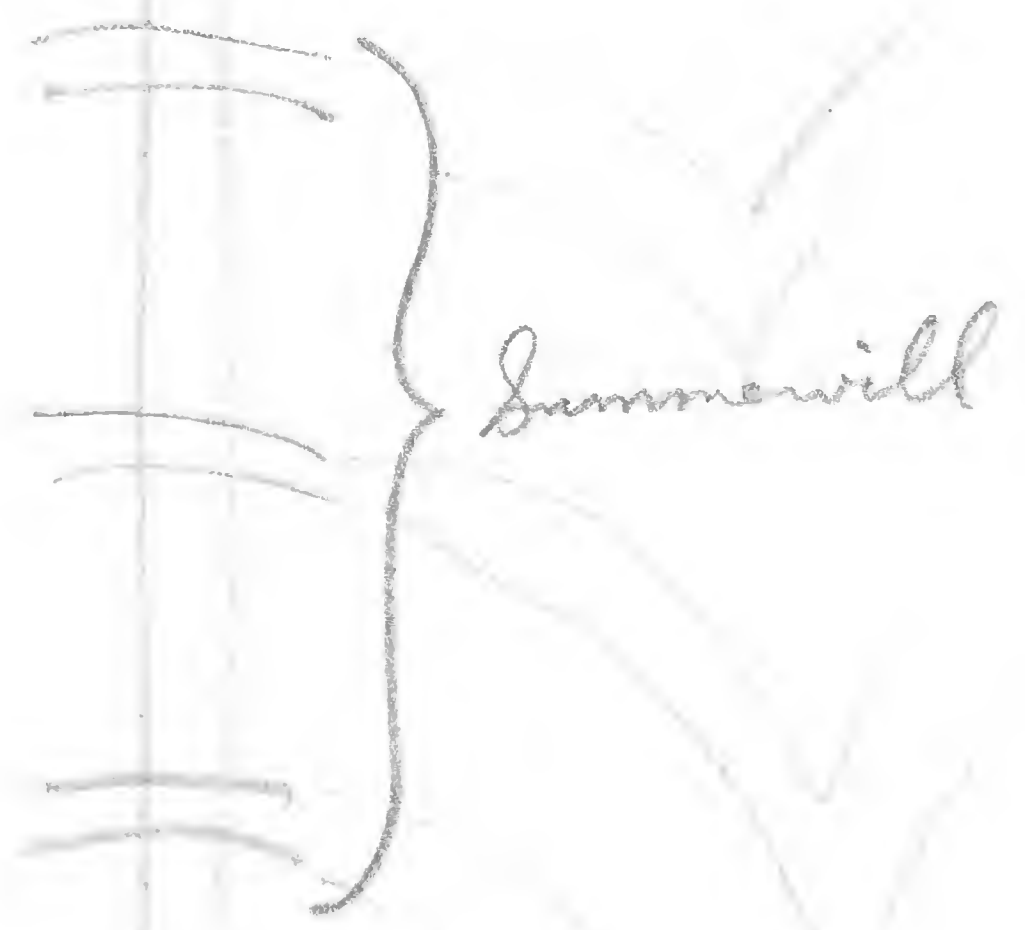
A

ville ls.

7'

10'±

Killians ls. (D) - black shaly ls.  
containing fossils. Big *Gomphocrurus*,  
*Dentolium*, small *Strophodont*, *eraticus*  
very abundant, Big *Athyris*, big sp.  
*mucronatus*, unidentifiable clams.  
Many small *Favosites* (club-shaped and  
digitate), ~~some~~ large *Stromatopores*, and  
an occasional *Acervularia*.  
I think this is the black bed near  
the base of the Alpena Quarry.



Sumnerwill



Red

Dark shale

Kelligins Is.  
outcrop.

Yellow  
clay



40.

The reef of Ulrich is a low anticline (sharp) extending due south. About east of the road exposure of Killian ls. <sup>thin</sup> anticline. In places, the beds separating and crossing the road at intervals. The Killian makes a steep bluff facing Long Lake. Under this bluff the anticline plunges under the bluff.

42

Aug. 15-

1736

On N branch of Hynden Bay  
river about two feet of  
gray fine-grained ls. abounding  
in *Rhynchonella* aff. *coronatus*.  
Other fossils were *Platyceras*,  
*Rhynchonella trophica*, *S. dentosa*.

This suggests the same beds as found  
on the arch at Norway Point Dam.



Aug 16 -

1737

X3

28.65

A<sup>16</sup>

Section along S road from  
4 mile dam. +  
A - From a point about 0.1 mile  
south of dam in road at dam  
and for 0.2 mi. beyond (S) of this  
point rock is exposed along the  
roadside. At the bottom it is  
coarse crinoidal ls. but at the top  
of a low rise opposite first turn  
on west side of road the rock is  
rather dark gray, smooth ls.  
Fossils are common in all parts -  
In the lower part were seen *L. granosa*,  
small *Atrypa*, small *L. demissa*, small  
*Athyris*, *Helicotrophia*. Higher were  
*S. dolabratus*, small *Pentamerella*,  
*C. cornuta*, medium sized  
*Strophodontes*. In this is the ls.  
above the hole visited on Sunday  
Aug. 12.

A<sup>16a</sup>

B - 0.1 mile further south in ditch  
and exposed for about 20 yds is  
dark gray ls. with *Favosites*, *Cyrtophyllo*,  
cylindrical corals, digitate *Favosites*,  
*Stromatopora* (large), fairly large  
*L. demissa*, corals are the best of  
abundant fossils, with *Stromatopora*  
sect.

A<sup>16b</sup>

C - 0.7 mile further south of last point  
dark gray fine grained limestone  
with large *Stromatopora*, *Favosites*,  
*Atrypa*, small *Athyris*. The *Strom.* are  
gigantic.

29.35

D - The main road came at 30.65 and  
a little (1/8) mile to the east comes the  
*Corrugium* - *Stromatopora* locality.  
What we have come through here  
is essentially the Potter farm  
section.



424

Aug 16'

1738

32.55-

33.15

0.6 mile NW from bend of road on  
 private rd. is a cut in blue shale  
 at base, thin crinoidal ls., thin (4")  
 blue shale & thin crinoidal ls.  
 Fossils are *Pholidostrophia*, *S. demissa*,  
*Spinifer* aff. *concoloratus* type. This is  
 topographically lower than the  
 crinoidal ls at the bend. *S. minor* etc.

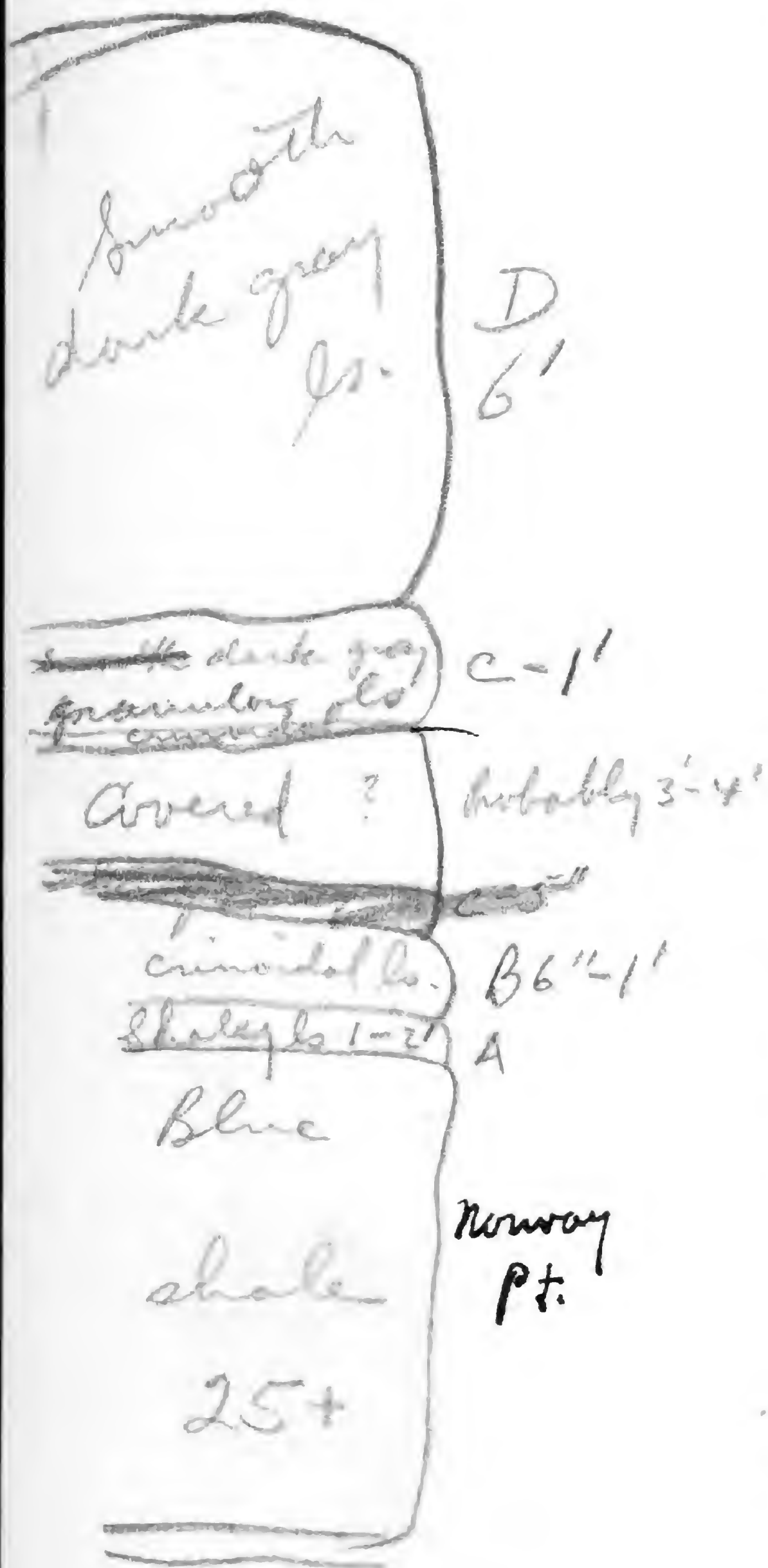
33.15-33.4 Patch of same ls as Aug 16'.

33.65 road turns to N. The thin limestone  
 beds underlying the soil all along the  
 road and the road comes out at  
 the upper down. Hence the  
 crinoidal beds overlie the Boom down  
 section also. This material just  
 underlies the coarse crinoidal rock  
 and I would guess there is about  
 1-2' of it.



44a

# Section of Potter Farm beds above the Boom dam shale



B - small *Athyra*, *Cyst. alpenensis*, small fine-lined *Pentamerella*, & granular, small *L. demissa*, small fine-lined *Athyra*, *Dolotocrinus*, *L. macronotus*, *Pecten*. This coarse crinoidal limestone is exposed for fully 60 yards along the road and exposes a vertical mass of 6" to 1'. The upper 5" is considerably leached and replaced by silica. This stone undulates along the ditch to the base of the first terrace a little N of the first house on W side of road. Above the crinoidal stone there is a covered interval of 5' then ~~smooth dark gray ls.~~

C - ~~smooth dark gray, fine-grained ls.~~ *Pholidostrophia* crinoidal ls at base with - *Camerochoria*, *Pentamerella*, *Cyrtina*, *Stromatopora*, *Devonites*, *Phacops*. This is opposite 1st house on W side Rd. S of corner

D - smooth, fine-grained dark gray ls. weathering ash gray - *Pholidostrophia*, small corvicanthid, small *Camerochoria*, small coarse *Strophodont*, *C. boothi*, - 6' thick

Probably <sup>15-</sup><sub>1</sub> 25 feet of rock to top of *Stromatopora* zone down road (C)



42.85-

44.5-6

45.1

Aug 16<sup>2</sup>  
Orchard Hill 1739

A - unfossiliferous gray ls. capped by  
a few inches shaly ls. abounding  
Cyathophylloids & other corals.

B - hard ls & shaly ls abounding in  
Pentamerella, S. mucronatus &  
Lytina

C. Hard gray ls. with Pentamerella

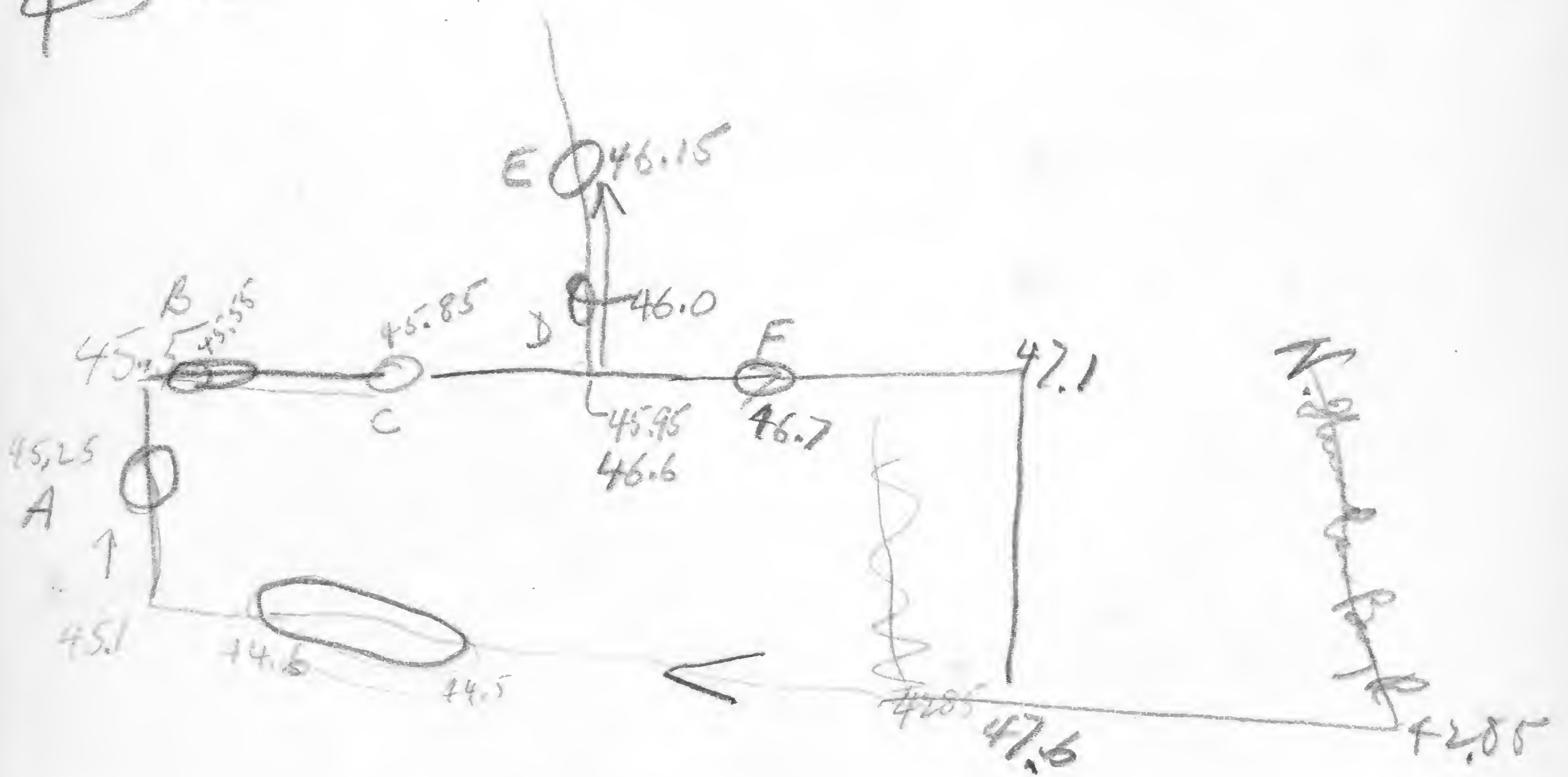
D - poorly fossiliferous gray shaly ls.

F - hard gray ls. about 8'

This is a roughly circular  
mass with quadriversal  
dips. There is dark gray ls.  
and shaly ls. corals are  
abundant in the shaly ls.



45a



46

# Section of Thunder Bay Composite

1740

80'

Greenstone beds	4'
Partridge Point	14'
Covered	67' Too high
Polka from 4 S of 4- mile down	25'
Blue clay 2.	25'
Sandstone and limestone at base of 7-mile down	22'

157



47

Aug 17

1741

Section in Michigan Alkali Co  
summitA - shaly, heavily bedded ls, blue gray  
in color, 12' thick.

P. rana

Big Spirifer

big Atrypa

"

S. concava

Pteronotaria c

S. mucronatus

Stromatopora

big Sclerophoria

Big spinose Platyceras

Favosites

Cystiplyllum

Big Gypichela <sup>romingeri?</sup>B - consists of about 20-25 feet of a  
variety of rocks all stained brown  
to black from bituminous matter.  
In the lower part the rock is  
bituminous granular to containing  
many cavities partially filled by  
soluble fossils here are -

Camerothoria

Crurana

Gypichela large &amp; small

Cypricardina

Cypricardium a

Fine-lined Atrypa

Bryozoa

Small Strophodonta

Allostoceras (lower)

Ottoceras

C - About 21 feet of heavily bedded  
grayish brown, 4 in to 8 in x 12 in ls.  
abundant in a small to large  
fine-lined Atrypa very abundant in  
the shaly partings. Other species are  
S. mucronatus small & slender, a  
small gibbous mucronate Strophodonta  
S. concava type a few corals. Corals  
are scattered through. Dickinsonia.  
Phacops, Productus, big Spirifer.

blue clay 3'

Buff x-lm  
ls. with  
huge  
Accumularia  
Reefs.

57' ±  
D.



Alameda

slide pathing 2" - 3" - level of reefs many fossils

Heavy-bedded  
brown gray  
x-lm. ls.  
with fine-  
lined whorls

21' C



Brown ls.

Brown shaly  
ls. + porous  
ls.

20' B-  
25'

Newton Ck.

Shaly ls  
blue gray in  
color

12' A

Genschow

floor of cty 500' above sea level

62' by Barometer



48

In the black shale at the top of the brown ls. were seen mucronate *Pholidos trophia*, small *Strophodonts*, *trigona*. The upper 10 feet just below the black shale, which was seen on the north wall only, is fine-grained brown porous ls. The lower 10+ feet more clearly bedded and darker in color.

On the north wall in contact with the 2' of black shale are about 5' of brownish shaly ls. interbedded with white plates of corals & stromatopores. This bed is not present on the south wall of the quarry.

D - mostly buff xln ls. with fossils difficult to get owing to massive & semi-xln rock. The big white *Acervularia* reefs are bedded on this level.

167  
41  
33  
22  
15

Highest Pt. of Dy. — 622' or 44' above lake level.  
Elevation of floor of Dy. <sup>573</sup> 503'  
First floor level (Reefs) — 565'

Quarry is 119' deep.  
Scotty says 126' to crusher, said to  
be rock figure.



1743

## Wessel Road Section

4A

00.0-0.4 Black Alpana (Kellians ls) 0.4 mile  
 A. So of section line to the north. Fossils  
 seen are:

Lynceus (Clark)	Small Sympodula
Ostracods	Conocardium
Small Strophodonts	Digitate Favosites
" Atypis a	Agarularia r
Productella	Proetus a
S. mucronatus	Phacops

0.4-1.0 Section line —

1.0-1.1 — Gray fine grained ls. forming a flat —  
 only upper surface visible —

B. Small Pentamerella sp. Agarularia r  
 fine-lined Atypis Cup corals  
 S. concava, Small Atypis

1.1-1.



Long Lake Rd Section 1744

5 A17<sup>A</sup> A - 0.2 miles S of Killian ls. outcrop - Killian ls

A17<sup>B</sup> B - 0.65 miles S of Killian ls outcrop - same exposure as Ben Weasel Road with small *Pentamerella*, *S. concava*, small *Atthyris*, cup corals.

A17<sup>C</sup> C - 0.0 - mi. S of Killian ls. outcrop. brown shaly ls with many small *Atthyris*, *Pentamerella*, *S. concava*, small *S. depressa*, large snail occasional corals. It is much like the beds ~~described~~ described as B. *Pterinea*

A17<sup>D</sup> D. 1.95 - gray crinoidal + fine grained ls. containing *Gypidula*, *C. mucronatus*, *S. concava*, *Pholidostrophia*, *Orthis*, cup corals, *Acervulina*, *S. mucronatus*. Some of the material is brecciated ref ~~etc~~ stuff. Some flint or chert in masses.

A17<sup>E</sup> E - 2.05 - gray shaly ls.

A17<sup>F</sup> F - 2.4 on W side road massive reef breccia light gray in color with small *Gypidula*. clay field gray ls with much chert and moderately large *Atthyris*.

A17<sup>G</sup> G - 2.55 - small <sup>map</sup> on W side road - coarsely crinoidal + porous limestone with small globular *Gypidula*, *Cypriocardia*, *Atypa*, *Camerozonia*,

A17<sup>H</sup> H - 2.85 - medium gray, fine-grained ls, rather hard, containing large cephalopods, *Symphoseroidea* & *Nephrolepteroidea*.



4.25 - city limits.

Aug. 18.

Section of Alpena along  
French Road. 1745

5 / All distances taken S of Kithiwa to  
outcrop.

A18<sup>A</sup> A - 0.20 mi. - gray fine grained limestone  
abundant in *Pholidostrophia*, sp.  
*mnemonatus*.

A18<sup>B</sup> B. O. 9 - By side of road and in  
fields on each side N, E & W  
are boulders of limestone, some  
platy some massive. The former  
are from the *Pholidostrophia* beds  
at the King School. The massive  
kinds are from the lower bed at  
the base of the Alkali Quarry, some  
of the blocks loose here contained  
*Cranaea*, small *Conocardium*,  
*Gonophoceras*, *Orthoceras*, *Coniophoria*

A18<sup>C</sup>  
Gohl School Road Sw cor.  
Measured N from corner of sect. 18.  
01. 85 mi. plates of ls. with *Pholidostrophia*  
& *C. coronatus*.

A18<sup>D</sup>  
0.3 mile S of Polish School on east  
side of road is a sink exposing  
beds with fossils. Rock is gray  
weathering ash and represents  
very bottom of Alkali Cr. Here  
occur *Aceroulabia*, *Stromatopora*,  
big *Gypidula*, *Schizophoria* medium  
sized *Atrypa*. On slopes above  
sink to S & E of it were seen  
brown ls pieces with *Gypidula*  
& *Cranaea*.

On the east side of the road



52

1.1 mi. N of  
County line

in the fields of the house at the section line on east side of road are big blocks of the soft, brown-fossiliferous rock above the goniatites bed.

1746

A183

2.9 miles N of R.R. track at Bolton and 0.1 mile S of school at fork in roads is an outcrop of Killians limestone on east side of road. It is probably the lower part of the formation. 0.9 mi S of this exposure is outcrop of small *Athyris* ls overlying Killians.

A184

0.9 mile N of R.R. track at Bolton on west side of road (100 yds) is outcrop of coarse reef sand with *Pentamerella*, small smooth *Hyridula*. Contains *Aceroularia*.

This is 1.85  
miles S of  
school.

A185

Section along Long Lake Rd-

- Stop-1. - 0.15 mi. south of Killians ls. is Black Alpena.
2. - 0.25 mi. - loose pieces of Killians and lighter, gray ls. with *Aceroularia* and *Schizophoria*.
3. - 0.30 - gray fine-grained limestone in place with *Athyra*, big *Spirifer*, *Schizophoria*, *S. hirsutus*, *Athyris*. This is undoubtedly at the base of the Alkali Bay.
4. - 0.75 Town Hall school + section-line *Athyris* beds.



{3

5. 0.95-1 These are the limestones with the large snail and Pterinea, many medium-sized Athyris. So far have seen no loose blocks from the brown bed.

1747

6. ~~0.95~~ 1.45 — in field to west of road and 400 paces SW. Coral and reef lts. with big Spizifer, Athyris, & Conocara, etc. Saw no blocks of brown ls. Aceroularia + Stomatopora a.

7. 1.7 reef lts. place and along old road. Saw one loose boulder of brown bed.

8. 2.0 — grey fine-grained ls. with Aceroularia, Favosites, & mucronatus.

9. 2.4 — gray fine-grained ls. with chest yellow was found the piece with Gomphoceratops & Conocardium. This was the only such piece seen.

A18'

Thunder Bay Bay

A — reef ls.

B — see blue shale collections

C — hard knobby & reef ls. with shale partings! — Favosites (big), Stomatopora, cup corals, small Spizifer, Erypa, Pecten

coral ls

7' + C.

Blue sh

8' B

gray ls

with large

white

Aceroularia

reefs.

40' A

The surface weather yellow



Aug 19.

1748

54

Section on section line at Town  
Hall School - All measurements  
from Alpena - Long Lake Road

0.15 - gray ls. with many small *Atypa*,  
*Pholidostrophia*, *Pterinea*, *S. mucronatus*,  
*Atypa*.

A19'

Section on County line

0.30.

A19' A - Killians limestone (near top)  
This is along the north line of NE 1/4 section  
3, T32 N, R7E, 0.3 mi. W of corner.

A19' B. 0.50 miles farther west is a foot  
of gray ls. with crinoid debris, *Atypa*,  
*Pholidostrophia*, *S. mucronatus*. The  
rock weathers brownish gray. It is  
like the rock at Kings School with  
the exception that *Pholido.* is scarce.

A19' C. 0.65 - gray crinoidal limestone  
weathers brown. Contains *Schizophoria*,  
*Acroniaria*, small *S. demissa*, *Atypa*.  
This is estimated to be 4 or 5 feet  
above Killians.

county-line  
Along old road west of Bolton  
road are bedded limestones with  
*Atypa*, *Cyatina*, small *Atypa*, small  
*S. demissa*. Fine-lined *Atypa* like the  
one in basal brown bed.



55

Aug 20.

1749

3  
N  
N  
A About 0.4 mile west of Beebe School comes black shale (but with abundant *Styliolina*). At Beebe school a little west of the turn at the school is peculiar unfossiliferous smooth gray ls. with solution cavities. This is almost the actual contact. Loc. 24

N  
B 0.2 mi. N of the school (Beebe) and a few feet lower are limestones with *Strophia*, *Conocardium*, small ~~Strophia~~, digitate *Favosites*, small *Atypis*. These beds are in middle + top of Qy  $\frac{3}{4}$  mile N of Beebe.  
C 0.2 mi. north of B - gray limestone with *Spirifer*, *Strophomena*, etc.

## Loc 25 Quarry at Afton

Lower part in same beds as those seen at Sorenson Quarry. Above are bedded ls. with *Strophia* and on top of bed + black shales containing *Strophia* + digitate *Favosites*. Quarry is about 30' high at highest point. The section in the quarry is the same as that along the Road to Beebe school (West line of NW  $\frac{1}{4}$  sec 13, T 34 N, R. 2 W.

## Sorenson Qy.

This is along the section line about 0.4 mile S of the NW corner of sec. 12, T 34 N, R 2 W. The rock is a gray massive limestone greatly pitted. Suggests fresh water limestone. Contains many clams. This bed appears at the base of the Quarry  $\frac{3}{4}$  NE of Afton.



5.35 corner  
0.6.75 mile - from G. Sorensen by

# Lower Loc. 2750

56

Below dam on Black River at Lower is gray ls. containing large *Dypidula*, *Pterinea*, *Schizophoria*, large *Atrypa*, *Strophodontia*, *Conocodium*, *Acerularia*, *Stromatopora*. This combination + particularly the big *Dypidula* suggest the beds just above the *Phillips* ls. SW corner NE 1/4 sect. 3, T 34 N, R 1 E.

Quarry 1 1/2 mile SE of Afton.

Here there are 15 feet + of Buff granular and crinoidal limestone containing *Dypidula*, *Conocodium*, large *Strophoceroides*, *Atrypa*. The ls. is very bifurcated. The appearance of the rock is the same as that of the brown bed at the bottom of the Mich. Alkali Co. Co.

Osgood Falls. Loc 30.

15+ feet of dolomitic rock abounding in *Stromatopora*, *Acerularia*, digitate *Favosites*. This is the lower Rockport.

## Black Lake Loc 29.

About 20' of smooth gray unfossiliferous ls. resting on the floor of quarry which abounds in *Stromatopora* and digitate *Favosites*. This is the lower Rockport. The upper ls. is the upper Rockport. Above this ls. there are a few feet of shale.



57 Containing *Athyris*, small *S.*  
*demissa*, *Pyrt. alpevensis*  
*Spinifer*, etc. This is thought to  
be the shale above the Rockport.  
This shale is capped by a  
thin ls. bed.

58

# Michigan Specimens 1752

*Lepidasterella babcocki* Schubert  
Pulteney, Steuben Co., N.Y.

From shale at Henry Pt  
Hindshaw has many fossils  
which are like those for the sh.  
above 4 mi dam section:

<i>S. granulosa</i>	Wide fine ribbed, short
<i>Cyrtina</i> (large)	<i>S. mucronatus</i>
Small <i>Atypa</i>	fine-lined <i>Atypa</i>
Small <i>S. dentata</i>	Small <i>Pentamerella</i>
<i>C. coronatus</i>	

Cut of B.C. & A. R.R. has lower  
Patten Farm stuff with *Cyrtina*  
*alpenensis*.

*Fav. tubinatus* also from 7 mile  
dam with *S. granulosa*



59

Quarries at Silica

1753

A - Buff granular ls. with *C. coronatus*, big *Strophodontas*, *Acerolana* in top 3'. This grades into a bluish ls.

B - Limestone bluish on the surface argillaceous with big *Strophodontas*, big *Atrypa*, - 4'

C - Shaly ls. 10" with big *Platyceras*, *Pterinea*, *Leptonychia*

D - Soft blue shale containing *Leptostrophia*, big *Schizophoria*, *S. concava*, *S. dentata*, *S. uncinata*, *P. rana*, *Pterinea*, big *Atrypa*

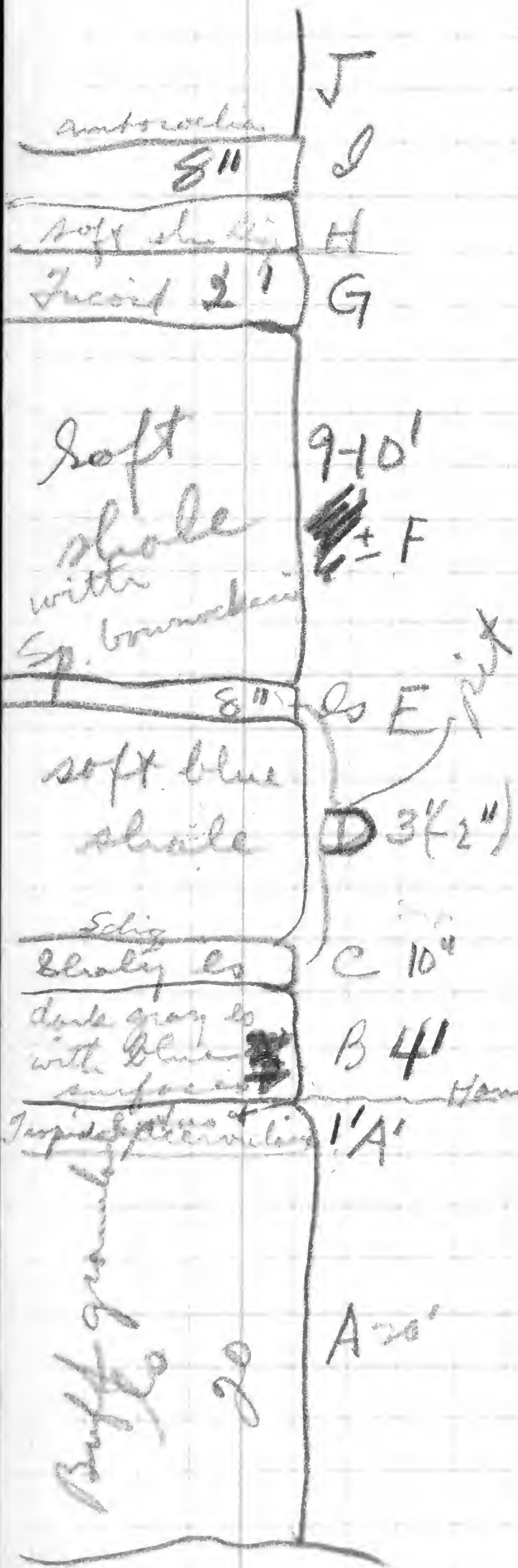
E - shaly ls. 8"

F - Silica shale - 9-10'

G. 2' - hard blue gray ammonoidal ls. with *fucoids* & *worm tubes* on bottom ~~has *Ambocoelia*~~

H - 4" blue shale with *S. dentata* short & wide and *Rhipidomella*

I - 8" of hard gray ls. with *Ambocoelia*





J - shale abounding in Ambocoelia and bryozoa, S. mucronatus

Quarries at Silica, Aug 25.

Bed B - In fractured section this rather brownish gray rock suggesting Delaware but being much shaler and not so hard. It is in about five thick beds which are separated by brownish gray calcareous shale. Copals are abundant in the 2nd, 3rd, & 4th beds from the bottom. Here are cups and tabulate corals. The base of B rests on a one foot bed of the upper Columbus which is crowded with *C. coronatus* and a big *Epiphyra*. The lowest bed of B is 14" thick and contains *Acervularia*. This was not seen higher than this bed. It also contains spinifer like *S. mucronatus* and big *Strophodontas*.

Fauna of B -

<i>Acervularia</i> (bottom only)	<i>S. concava</i>
<i>L. demissa</i>	big <i>Atypa</i>
<i>Schizophoria</i> (big)	" <i>Epiphyra</i>
<i>S. mucronatus</i>	<i>Cyrtina</i>
<i>Pholidostrophia</i>	<i>Cratopora</i>
<i>Leinoptera</i>	<i>J. carinatus</i>
<i>Favosites</i>	

A' - Below the lowest bed of B which has both Columbus and Silica lithology is a 1' bed abounding in *C. coronatus* and *J. carinatus*. This bed has the Columbus lithology. This bed is just below the *Acervularia* bed in which *J. carinatus* also occurs. Further the *C. coronatus* bed (A') also contains the *J. carinatus*.

Range of *J. carinatus* - occurs in lowest of beds of B which is ~~not~~ occurs in C and Andy Mac Nairs lower than is undoubtedly from bed D.



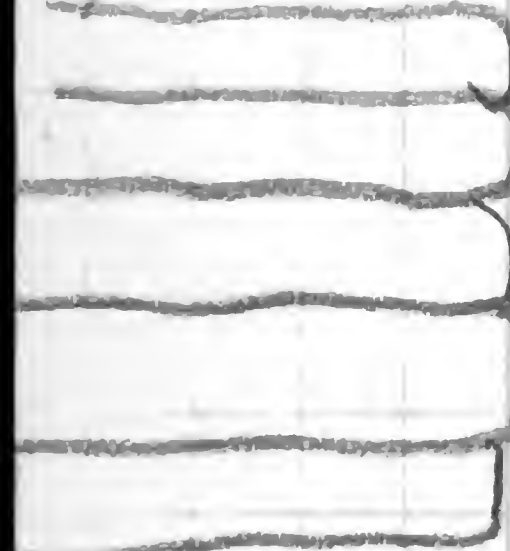
70

Fauna of D -  
*C. coronatus*  
*Leptostropharia* a  
*Strophodontas* a  
*Phacops* c

1755

Fauna of bed C -  
*T. carinatus*  
*Lophonychia*  
*Pterinea*  
*Strophodontas*

Dundee Columbus



A'  
 S-14"  
 T-14"  
 U-2'  
 V-1'

Dundee Columbus

A' - 1' - 14" with *Trapidolaptus*  
 S-14" buff to brown ls. with

T-14" buff xln ls with *P. elliptica*,

U-2' same - *P. elliptica*, *Conocardium*, *Productella*, *Cystina*

V-xln ls. with *Pholidostrophia*  
 big *Conocardium*



Aug 26  
Plum Creek

1756

- 71
- |                        |   |  |
|------------------------|---|--|
| Black sh.              | A | A - black shale with rolled corals at base                       |
| Dolomite               | B | B. 6-7' of dolomite with poor fossils chiefly corals.            |
| Shale + thin shaly ls. | C | C. Soft blue shale + thin beds of shaly ls. One layer of ls. has |
- |                     |                  |
|---------------------|------------------|
| <i>Leiorhynchus</i> | <i>Prana a.</i>  |
| <i>P. lirata</i>    | <i>Ostracods</i> |
| <i>N. linguata</i>  | <i>Chonetes</i>  |
| <i>M. subulata</i>  |                  |

### Branch of Pipe Creek

Section now very largely covered - upper part in hard limestone. The soft shales are not exposed, but there are abundant blocks of shaly dark gray ls. weathering light ash gray. These contain + *Leiorhynchus*

In the upper beds were seen



Ind., Ill., Iowa, Michigan

1935.

1  
Guy Campbell Collection  
June 21, 1935.

1757

Look up (or write for) *Hypidula rommigeri*  
described by Kindle from Indiana.

Chara paper to Mr. Campbell.

Spent morning going over  
Campbell collection. The afternoon  
was spent on a visit to Falls  
section at the Whirlpool opposite  
the government dam. At bottom  
~~zone~~ (as exposed at the high river  
stage when we saw it are heavy  
bedded ls. with corals. *Spirifer*  
*gregarius* zone exposed a few  
feet below the highest rocks  
which are in the *Sp. acuminatus*  
zone.

Agreed to send Mr. Campbell  
certain literature, such as Pal. Rep.,  
vol. 4, and Clava volumes. See if a  
copy of Nettleton can be sent.



2

1758

June 22.  
Beaver Dy. 3 mi. N. of Jeffersonville.

Resting on the *Sp. acuminatus* zone are 3-4' of coarse calcareous sandstone with fragments of fish. Two specimens of *Sp. acuminatus* were seen in the lower part of this sandy bed. Contains brachiopods & bryozoa. Some brach. badly worn.

New Albany

nodular

Hard finely granular light bluish ls.

cherty gray ls. bluish gray

Massive ch. with a little chert

ss. acuminatus zone

on.

3-4" F  
10" E

4 1/2' D

8' C

12-13' B

3-4" A

12-13' - ft. of shaly blue-gray weathering ls. Fresh fracture is brownish gray in color. *Clonites* (*gondellanus*) is abundant. *A. princeps*, *B. oweri*, *S. formosa*?, *Sp. like macronota*, *L. papilana*. This bed breaks into irregular lumps. It is more massive towards the top.

8' very cherty limestone with large *Sp. oweri*, *Atrypa*, *C. gondellanus*. Occasional corals.

4 1/2' hard massive ledge of sandy granular ls. in the lower 2' is an abundance of *B. oweri*, *Atrypa*, *S. demissa* (types), *S. acuminatus*. The upper foot is more granular than the lower part. *C. coronatus* occurs about 2 1/2' below the top. *Tropidoleptus* occurs with *C. coronatus* in the upper 1 1/2'. The upper surface of the bed is very irregular. No corals.

10" Beechwood ls. - dark blue granular ls. with pyrite ~~at~~. Fossils: large *Rhipidomella*, *Trachypora*,

Lophomylus in upper 3'



3 *C. coronatus*, *Atrypa*, cup corals  
worm burrows, 1759

2-4" nodular, pyrite layers with  
probably phosphatic nodules.

2. photographs.

R. Hilton Farm.

SE  $\frac{1}{4}$  NW  $\frac{1}{4}$  51, north St. by 62, near Prather.

10-10  $\frac{1}{2}$ ' of light gray crystalline  
and crinoidal limestone (Beechwood)  
*Acrocrinus*, *Vitulina*, and *Pentagonia*  
with *Spinifers* were seen.

*Hadiophyllum* occurs with *A.*  
*fultonensis*, *Leptaena*, *Japhugites*  
*deformis*, *Rhipidondella*, *Sp. bynesi*,  
*S. demissus*

Section 113 Clark Grant

Section of Silver Creek mostly  
all shaly limestone. Quite rare  
in upper part.

*Sp. anchi*

*Camartocaria*

*Sp. varicosus*

*B. sulcomarginata*

*Cl. yandellianus*

*L. perplana*

Fragments of small animals

The rock is blue gray breaking into  
fine lumps.

NW cor. Sec 90- to Clark Co Cement  
Mill,  $\frac{1}{2}$  mile SE of Sellersburg.

Beechwood - basal congl., black pebbles

Huddle 374 Picture 3.



4

Send all Teller & odd  
trays to Mr. Campbell.

1760

Loan Mr. Campbell Eatons  
By-Passing & Barrells diastems

June 23, 1935

Green's Quarry

Excellent exposure of Beechwood

Lower layer 50" with 2-3" conglomerate  
of phosphatic pebbles. Flume follows  
27" limestone with 2"-3" of phosphatic  
pebbles at the base

New Albany

27" In the lower part of the Beechwood  
and including the conglomerate bed  
were found:

Vitulina pustulosa

Pentagonia

Centronella

Atypus

Platyceras

Sp. owens (?)

Sp. divaricatus (upper part lower bed)

Productella

P. carinatus ?

R. penelope

C. coronatus

A. spiniferoides

Proetus

P. flabellum.

Reticularia

Sp. sculptilis

L. perplexa

Pholidostrophia

Phacops.

D. inaequistriata

Rhipidomella

S. concava.

50"

Silver  
Creek.



Middleton Ky.

1761

5

300 yds. S. of B. & O. S.W. R.R. depot.  
Lexington, and

NA

9" F

A - 38" of ~~hard~~ softish light yellow  
or buff gray ls, very fine-grained.  
This bed abounds in *Sp. acuminatus*.  
Some chert at top of layer.

B - 7 1/2" hard blue gray limestone  
with thin chert drapels. Abounds  
in Rhipidomella and Schizophoria

Silver  
Creek

5-7" E

C - 23" - *Sp. macrus* (of Campbell zone)  
Brownish gray limestone  
with *Sp. macrus* & *Hadrophylloids*  
(in middle of bed).

*Sp. bynesii*

2' D

D - *Strophodonts*, *Hadrophylloids* in  
base, *A. fultoniensis* abundant, *Sp.*  
*bynesii* (name of zone - Campbell)  
Shaly weathering limestone  
*Productella*. 2 feet.

*Sp. macrus*

23" C

E. 57" Silver Creek

7 1/2" B

F. Beechwood 9" - Sandy, light  
bluish limestone. Lower surface  
irregular. Hard sandy limestone  
like basal *Fully*, contains  
*Clonodes coronatus*. Suggests  
& upper bed of *Graves* *Qy.*

*Sp. acuminatus*

3' 2" A.

23  
23  
57  
90- 7 1/2



Lexington Dept

1762

6

See Section by Border

NA

C. coronatus  
I. cinctus

2' C

23"

C - 23" hard sandy ls.  
with C. coronatus, I. cinctus,  
S. concavus, small Chonetes &  
Ceratopora. Similar to  
Leaves by upper part bed D.  
basal contact very irregular

Silver  
Creek

B  
A-4 1/2'

B. - highly magnesian ls.  
~~C. coronatus, I. cinctus,~~  
~~S. concavus, small Chonetes, Ceratopora~~

Onondaga

A

8

June 25

1763

SW 1/4 26-135-24 - About 12' soft  
weathered shale with *Leiorhynchus*  
Shale is brownish gray in color,  
very sandy, rather heavy-bedded

J. 25'

Lenticular weathered, massive ss.  
interbedded with shale. No fossils seen.

sh 6'

SS 1'

sandy  
sh 2'

ss. 2'

J 25'

Twenty-seven feet above intersection  
of creek + road (about 495') are 20'  
of hard sandy and cherty limestone.  
Near the base the rock is blue gray  
granular very hard. In a layer  
of this hard material were seen  
*Pentamerella*, *Utraculus*, *Tropidoleptus*,  
*C. coronatus*, *Douvillina*. About one foot  
above this layer are cherty limestone  
with imp corals.

Above this lower layer the  
rock is brown, sandy, platy  
and with much more crinoid  
debris. The main outcrop is in the  
form of ~~four~~ ledges, the lowest  
4-5', the next 2', the next 3' and  
the top one about 1 1/2'. These are

over



Between the Vitulina beds & the Misenheimer was a thick band in the soil which looked as if it had been ls. There must be alternation of heavy bedded sandy ls. and shale between the Misenheimer & the Lingle

This makes the Misenheimer (approx) 12-15' thick.

9

separated by covered intervals  
which may be occupied by  
shale.

1764

June 25<sup>2</sup>

1 1/2 mi. below Mtn. Glen

A-B Along Clear Creek

feet of  
gray ls. & limestone dipping 5-10°  
About 8 feet from the base the  
next four feet of limestone  
abundant in small corals, large  
Epirifer, small Chonetes, and  
Minerocyclus, Leptaena, Leptophoria.  
The presence of the last two suggests  
prob. Hamilton beds.

C Sandy shale of Menheimer lithology

E

D- somewhat shaly ls. with  
small Chonetes, small Epirifer  
S. tenuis ? 4' ? Bituminous odor

4' D

Above the ls. D. 13' vertically  
comes another ledge of limestone  
with the following fossils

1-2' C

4' B

F. Lowest exposed bed very  
hard ls. with Tridacoleptus  
rare. Above this is shaly  
sparsely crinoidal ls. with  
L. perplana, small Epirifer,  
small Chonetes, Platycephalus,  
P. rana, A. 'deussata' ?

A

The uppermost beds carry  
a little chert and are sandy

On a loose piece an  
abundance of Tridacoleptus and  
C. coronatus was seen with  
C. flabellum.

Hamilton  
6-7' F

N.

Covered

gray  
ls.

Sandy sh

Corals  
and  
Minerocyclus

5'



10

June 26

1765

A - The Grand Tower limestone is blue gray weathering in very heavy beds 4-5 feet in thickness. ~~at~~

B - The upper 5' 6" of the Backbone section is composed of very hard rather thin bedded limestone and shaly limestone at the top of which were seen Microcyclus, small cup corals, Phacops, Styrac, Strophodonts, sp. like Varicorthis, Equis like Oweni. The upper 16" carry much the same assemblage.

So far as I can see there is not a great deal of reason for separating these beds from the Grand Tower below.

In addition to the above fossils from the Microcyclus beds, the upper layers carry Schizophoria & Leptæna

These same beds are exposed farther north at the north end of the Backbone. The Tropidoleptus beds reported by Waller were not seen. It seems that the Misenheimer shale should come above the Microcyclus

The Illinois Devonian seems to me to be as follows. Judging by the section at Devil's Backbone the Microcyclus beds belong to the Onondaga. This is shown by the presence with Microcyclus of Schizophoria

16"  
microcyclus  
50"

Grand  
Tower

B

A



11

and Leptaena. It seems to me that, if the whole Onondaga is out between the Misenheimer shale and the Dutch Creek sandstone, the Microcyclus bed will be missing at Single Creek. The Misenheimer shale, I believe, probably overlies the Microcyclus. This is suggested by a covered gap between the Microcyclus beds at Clear Creek and the Hamilton and by the fact that the Tropidoleptus beds are supposed to be the "Backbone". The steep slope opposing the Microcyclus beds suggests this.

I think Savage was misled by Microcyclus into calling that bed Hamilton and was equally misled by Leiorhynchus into placing the Misenheimer shale in the Marcellus.

There must be shale at the Backbone and between Wells Tropidoleptus beds to have produced the dip slopes on the Microcyclus bed.



July 9.

1767

12

By Charlevix Rock Products Co.  
SW $\frac{1}{4}$ SE $\frac{1}{4}$  28-34N-8W.

Dolo-  
mitic ls

12' +

B.

A. - Blue shale with *Athyra*,  
*Cystodictya*, *Cameropecten*,  
(Stambrook has a good one),  
*Aceroulania*, small *Strophodont*

3' +

blue sh A.

B - at base platy dolomitic  
ls. with *Stromatopora*  
about 2' - 3'  $\pm$ . Above this  
are porous, petioliferous  
dolomitic ls. with scattered  
thin beds of oolite. Fossils  
are alveoli, snails (small) and  
a small *Athyra*

A = upper Gravel Pt.  
B = Lower Charlevix

13

July 10.

1768

## Gravel Point

Lowest beds of section are about one foot of brown rather hard limestone with large Stromatopores. The rest of the section consists chiefly of brittle shaly limestone (like the Trilobite beds of Lake Erie) in the lower part S. concavus occurs, in the lower middle part (Sp. iowensis?) (see one large specimen in the Museum) occurs with Cyrtina, Athyris, in the upper part Acervularia occurs rarely. Chonetes eumetensis occurs in all parts of the exposure except in the beds carrying Stroms. Pholidostrophia has the same range I suspect. Pohl's range for the Chonetes is too small.

Stamrock has best specimens of the Sp. iowensis.

~~Nowood~~ Bee

Section 1-2 miles NW of Nowood

On the beach at the lowest part of the section are about 2' of shaly, blue limestone abounding in fossils

Cyrtina  
Athyris  
Heteroschisma  
Gennaeocrinus  
Sp. bimesialis?  
Large Spinifer

Stropheodonta  
Cranania  
Athyris  
Pentamerella



14

This bed suggests relationships with the Partridge Point beds.

This is followed by about 2' of harder platy crystalline limestone containing scattered corals (Favosites + Cup corals) and *Atrypa*.

Above this are about 10-12' of thin bedded, platy limestone with several courses of chert. This limestone is beautifully mud-cracked.

Above this bed are about 12' of heavy-bedded dolomites, saturated with pitch. In this we found a few snails and *Gemmatites*? This upper heavy-bedded material may be our Squaw Bay.

Above the dolomites is a thin bed of shaly ls. with *Schizophoria*, *Pentamerella* and *Leiorhynchus*.

Quincy Potosi Portland Cement Co.

15

Section on shore between plant and crusher.

A - 9" to a foot of light grey shaly, brittle limestone containing many bluish irregular markings, perhaps worm burrows:

C. emmetensis	Large Atrypa
P. liata	Platycops
Sp. large	Proetus
Stroph. concava	Vertumna
Small Goniatites	Actinopteria
Pholidostrophia	Athyris

B - 9" - 1 foot chocolate brown ls. with *Gypidula*

C - 18" barren, brittle ls. with worm tubes?

D - about 10" shaly ls. with  
*Acervularia*      *Actinopteria*  
*Pholidostrophia*      *C. emmetensis*



16

## Section in Qy 1771

Dark shale		A - at top 2' of shaly brown ls. with blue tubular markings <i>Athyra</i>
Coral		
Bed 20'		B - Massive, heavy-bedded buff ls. with corall debris
K 4'	23'	
1' brown ls.		C - Brown massive ls. with <i>Pentamerella</i>
1' shaly ls.	I	
1'	H	D - Heavy-bedded buff ls. with <i>Stromatopora</i>
45" brittle shaly-fracturing brown ls.	G	E - About 7' of heavy-bedded limestone brownish gray, scarp-x-bed., with black shale between the partings.
4' blue sh + ls.	F	F = 6" gray ls, 3" blue gray sh., followed by 1 foot shaly limestone, 16" of blue gray shale, then about 1' of hard gray ls. all abounding in fossils. This is the zone from which all the fine free fossils comes: <i>Cyrtina</i> , <i>Sp. mucronatus</i> , <i>Ch. emulitensis</i> , <i>S. concava</i> , etc. The upper foot of F passes gradually into the brown ls of G.
7' brownish gray ls with blk sh partings	7' E	
Buff ls.	4' D	
23'		
3 1/2'	C	
Brown ls.		
3' massive buff	B	
Covered	A	
		D - 45 inches of hard, brittle, shaly-fracturing brown ls. Has the bluish tubular markings. Large <i>Strophodonts</i> ,



1772

17

H - 1' shale like that below

I - 1' shaly ls. with large *Atypa*  
This is light grey in color. This  
is bed A. of the shore sectionJ - 1' brown limestone containing  
*Atypa* + *Pentamerella*. This is bed  
B. of the shore section.Zone 2  
PohlK - 4' + of light gray ls. with  
blue tubes. No fossils. On thin  
layer 3", 9" below top is  
~~covered 5' +~~ made up  
of *Platystrophia*Pohl's  
*emmetensis*  
zoneL - About 20' (18 hammers) of  
nodular ls. abundant in  
*Acavularia*, *S. concava*, *Fossites*  
cup corals.M - ~~Dark brown shale~~ Brown  
granular ls. with *Acavularia*  
5'N - Gray argillaceous ls -  
0 - 4'

O - Three beds of massive ls.

P - 6" black sh

Q - 9' ls weathering blocky.



18

see  
Pohl for  
above

20' +

many overturned *Stromatopora*  
Bed 1 of Petoskey form. of Pohl.

coaly layers (1")

33"

dark gray ls. with thin carbonaceous bands

8"

breccia bed flat pebbles in upper part

Petoskey  
charleyi

2 1/2'

Heavy bed of light gray <sup>to brown</sup> ls. with thin carb. bands

31"

Buff ls. with carbonaceous laminae

9' +

Pelecypod - Gastropod zone  
Light gray limestone

19

Section on shore opposite Penn.  
R.R. station at Bay View

1774

21"

Weathered massive ls. Small digitate Favosites  
at base - Near top Cranaea, & smooth Pentamerella.

~~Favosites~~

13"

Brownish limestone, cherting to plates.

15"

light, yellow-brown, hard limestone

17"

Thinly laminated ls., brown gray. Weather to plates

1' ±

Light buff, hard, massive ls. with favosites

Hiatus

6" bluish, calcareous shale

1"



20

Section E. on beach from  
preceding 1775

Hard

7' 1/2

Pelecypod - Gastropod bed

F

9" Favosite bed (see section on preceding page)

D

5' Sparsely fossiliferous limestone beds.

Top of Gravel Point Stage

7' ± C

Blue shale (said to be same of Charl. Rock. Prod. Co.)

B 1' ±

blue calcareous shale

A

3' + Hard brownish limestone abounding in large Stromatopora, Annularia, Pentamerella rare. Found small Camerophoria here 1938

{ Hopper xls in ls. seem to have come from below the Stromatopora bed A  
OK





Pohl's loc. 21 1776

21

Mud Lake

E 2'

Dark gray shale with abundance of  
*Strophodontes* (coarse), large *Spinifer*, *Sp. mucronatus*  
Big *Pentamerella*, ball *Favosites*

D 7'

Hard layers of limestone separated by  
thin beds of shale. *Sp. mucronatus* at,  
*Athyris*, *Strophodontes*, fine lined *Athyris*  
Small *Reticularia*

C 4' 7"  
15  
14"

Shale with thin ls. beds.  
Ball-like *Favosites*, *Sp. mucronatus*.  
coarse + fine *demissa*, large *Athyris*

B 4'

Fine-grained yellow or buff, massive ls.  
big *Pentamerella*, *Athyris*

A 3'

Thin, crinoidal + shell breccia with  
*B. petroskeyensis*, *Cyrtina*, large *Spinifer*.  
*Sp. mucronatus*. 2 thin layers shale at top

*Synidula petroskeyensis* (floor of A)

This locality suggests the  
Potter Farm beds.

22

July 13.  
 Section on Road at Center of N line  
 of Sec 30-35 N-1W, 2 mi. N of Afton

A - Lowest beds are 6 or 7' of shaly  
 ls or limy shale, light gray in  
 color and yielding free fossils  
*C. alpenensis* *Chonetes* (fine lined)  
*Productella* *Pholidostrophia*  
*Pentamerella* large

These beds suggest the layers under  
 the Killians.

B. - Dark gray to black limestone  
 weathering and splitting shaly. Near  
 bottom a little black shale. This  
 appears to be Killians  
*Large Sp. numeratus* *Acervularia*  
*Large Spirifer* *Symphysurus*  
*Ball-like Favosites*  
 About 12'.

Wauthin found a layer with large  
*Pentamerella* in a small area  
 to the N which he thinks underlies  
 the bed A. I believe the rock dips N  
 and the *Pentamerella* overlie Bed A.



23

## Section in Afton Dy.

- Dark gray, finely granular ls.  
becoming lighter & smoother at top.
- 10-15' *S. pennatus*.
- 8-10' Large *Pentamerella* a, *Pholidostrophia*,  
snails, *Stromos*, *Stroph. costata*, Large  
*Stroph.*, *Acronotaria*, *Cypriocardina*, *Succinea*,  
*Strom.* bed of Northern Lime Co. Dy.
- Thin beds of limestone separated by  
black shale partings. Dark gray to  
black <sup>finely</sup> granular ls.
- 6 1/2' *Favosites* (*digitata*<sup>a</sup> and massive), *Acronotaria*,  
Cup corals, *Gomphoceroids*

7'

Finely granular, porous and oolitic  
limestone in two heavy beds. Light  
faintly yellowish gray.

5'6"

Dark gray thinly banded limestone, almost  
black, *Welleria*.

15"

6'

Soft, sandy, brecciated layers, rusty  
Hard, smooth, light gray ls. roughly pitted  
on exterior. Cup coral at top.

Hard  
dark  
gray  
smooth  
ls. with-  
out pits

4'

covered  
to floor

10'

NE side  
all rest  
S side

24

July 14.

Visited Rockport, collected all day.

July 15.

Shalepit (use this)  
Abandoned Dy. Alpena Portland  
Cement Co.

The base of the Genesaw is  
to be taken 5 feet below the first  
thin ledge of hard limestone. In  
this 5 feet the shale becomes  
harder and more calcareous  
and Genesaw fossils appear  
mingled with those below (the  
*C. coronatus*) and many of the lower  
fossils run into the Genesaw.





July 16.

25

Dundee at Calcite.  
Michigan Limestone & Chemical Co.

Trench in floor of quarry exposes 40' of rock, the lower 20-25' of which is dark brownish gray limestone containing many *Strophomena* and some black shales. The upper 15-20' are of lighter brownish gray ls. Fossils seen are *A. spinosa* type, *A. reticularis* type, a large *Procardium* (Wartini), large *Paracyclas*, snails, no large ones seen, *Gypsidula*.

Between the Trench and the main quarry face is a gap of about  $\approx 5'$ . Then come 55 feet of limestone lithologically like that below. Fine-lined *Strophomena* and *Schizophoria* occur in the lower 20'. *Gypsidula* is common to within a few feet of the top.

From large Bell Stairrock  
has excellent  
snail, *Elytha* & blastoid

*Paracyclas* occurs in lower Bell.



# Iowa

Sheffield ————— Chemung

Linn Ck. { Owen  
Cerro Gordo } Hack-  
Juniper Hill } berry  
Independence + St. Albans ?

---

Shell Rock { Mason City  
Rock Grove  
Nora

---

Cedar Valley { Stomatopora  
Cranaena - Petosky  
Waterloensis  
Pentamerella  
Collaury { bellula (chonetes)

---

Minneapolis { profunda  
independens // Hyde

~~Albion~~

---

1807

Lanwood member

1. *Atrypa* (independencia) zone  
4 - 35 ft

where thick is divided  
into.

a. *Syroclera* beds

b. barren beds

c. *Sp. bruesalis* beds  
(*hypothyridina*)

2. *A. (profunda)* zone  
4 - 30 ft.

Littleton member  
2 - 55 ft thick

3. *Atrypa* (bellula) zone

4. *Pentamerella* zone  
has corals.

5. *Waterlovensis* zone



Coralville member

12+ — 35+

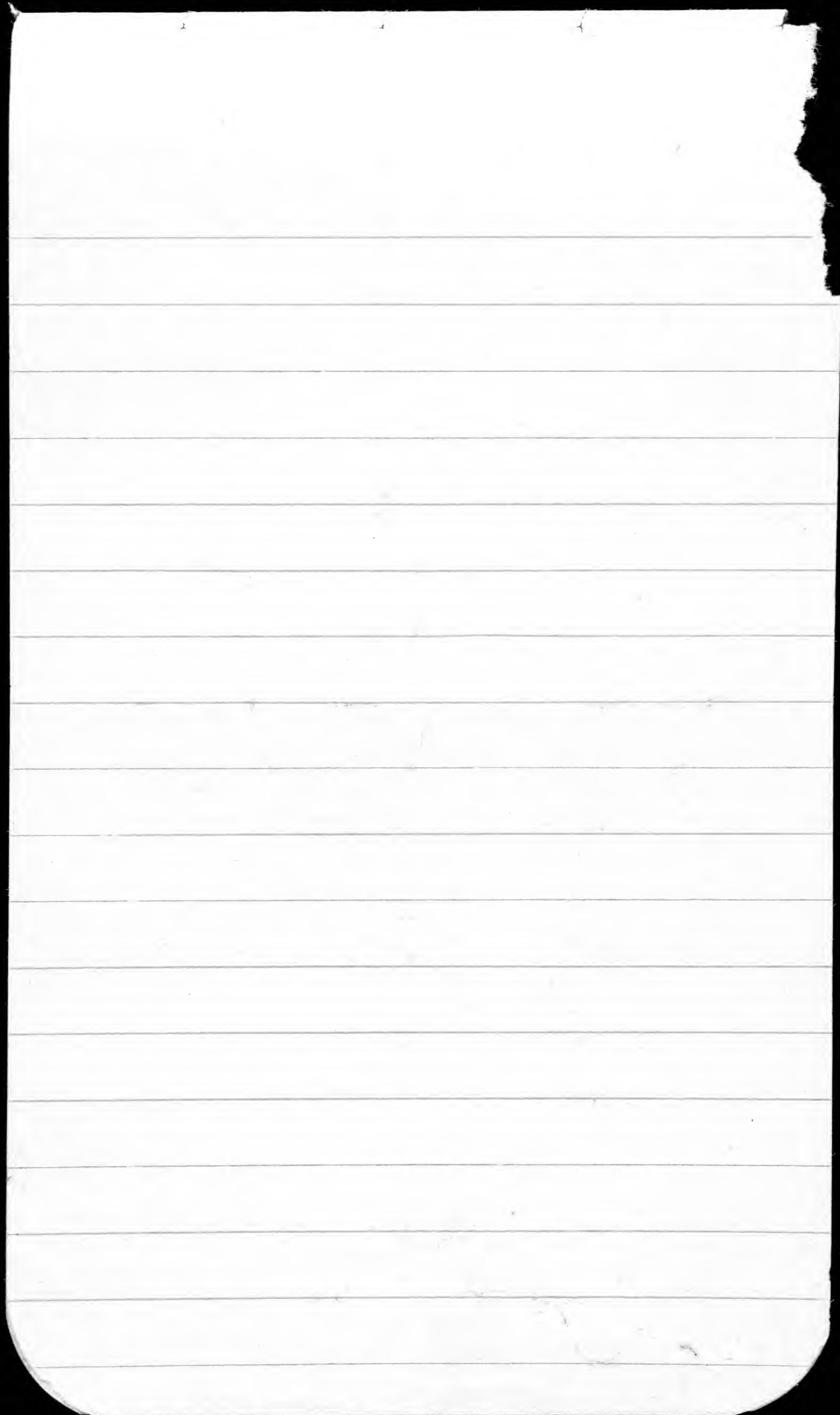
6.

(Cranaena) coronata zone  
(has corals in south part)

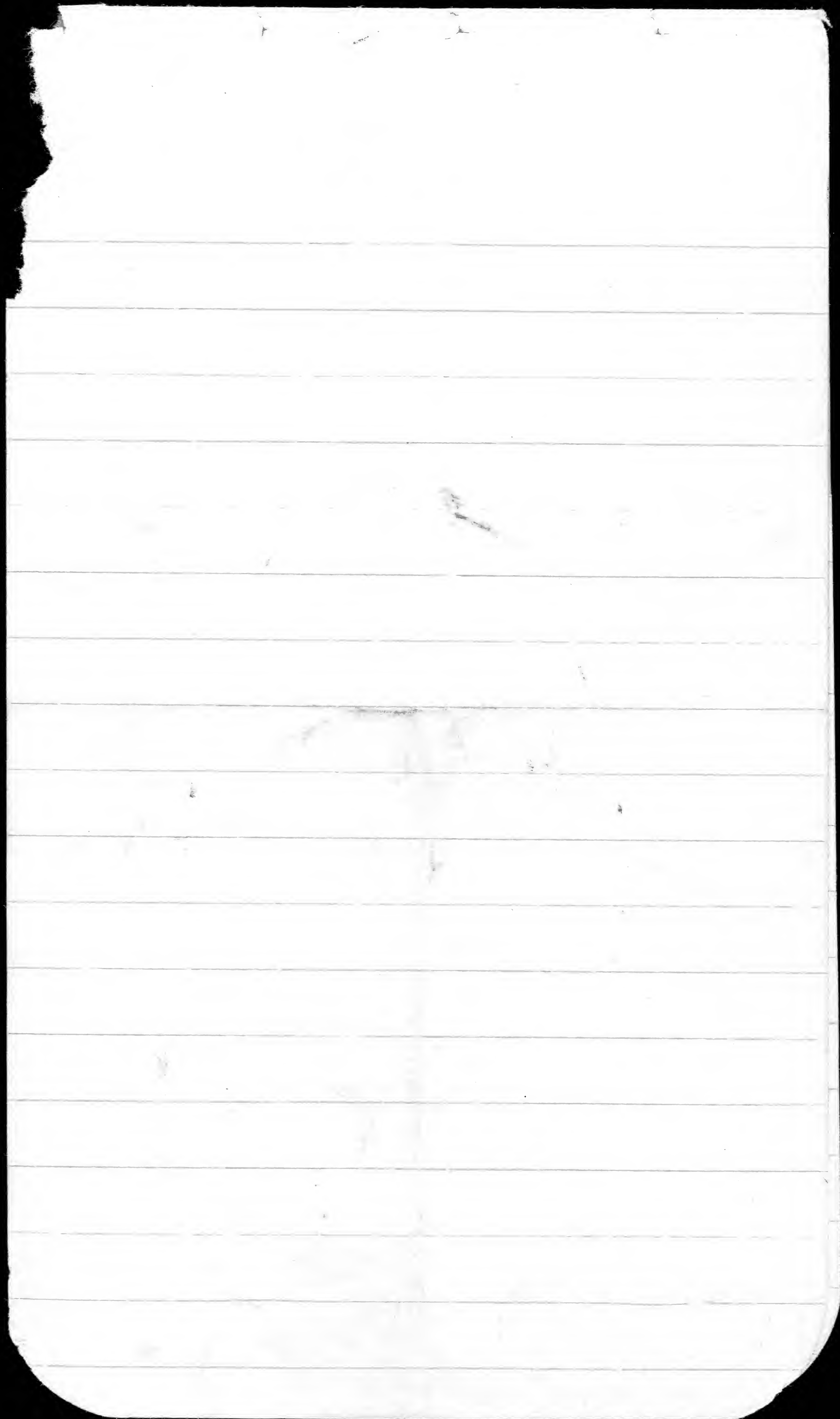
7. Stromatopora zone

has <sup>spherical</sup> stromatopora at  
top, much

sub-lithographic ls.  
dolomitic in places,  
not fossiliferous for  
most part.







## Section Brandon, Iowa

3. and vicinity  
Coralville member - 12 to 35'
- B. Stomatopora zone  
Spherical Stroms. at top,  
much sublithographic  
limestone in places.  
Sparsely fossiliferous.
- A. Cranaena iowensis zone  
Coal bed in south part.
2. Littleton Member 2-55'
- C. Waterlooensis zone
- B. Pentamerella zone  
A. Davidsoni bed.
- A. Atrypa bellula zone  
Strophoceras at base
1. Linwood Member 4-35'
- C. Sp. bruesioli beds.
- B. Barren beds
- A. Strophoceras bed



27

Send Scotty Levdigianus  
from Squaw Bay

---

July 18.

N of Cemetery are piles of debris  
from Potter farm beds taken out  
of road. Among the blocks are  
some with the same lithology  
as seen in the dy along the  
R.R., the many with the large  
snails.

Stambrink believes the Potter  
Farm beds correlated with  
the *Crassema rowensis* zone  
of the lower Coralville.





28

2 miles W. of Perm. 1783

Large Gomphocerids in coral reef sand. Many bryozoa, Pentamerella, Cranaena. Ledge now broken up and spread on road.

July 20.

Cut of B. C. E. &amp; A. R.R.

About 200 yds west of river and forming the crest of the terrace on the west bank of the river are 6-7 feet of bedded limestones, the upper 5' crystalline the lower part shaly.

Sp. eurypterus c.

Dolotogrinus

Small S. demissa

" alhyris

Fav. placenta (?)

Sp. Truncatulus

Small Pentamerella

A. petosqua type

Pholidostrophia

Cyrtina harrilltonensis

C. alpenensis

This forms the lower River Terrace

The second & next higher terrace about 300 yards west of the river is composed of 1 foot blue limestone at base followed by about 3' of coarse blue shale with Strophodonts and C. alpenensis. This is followed by 1 1/2 - 2' of bluish, thin bedded ls. There are not more than 5' of shale (?) intervening between

29

The lowest bed here + the top of  
the limest. zone of the first Terhaka

The 2' ls is followed by 15" of  
shale and this by about 2' ls.

The last ls. has *Cylindrophylloids* +  
colonial *Cystiphyllum*.

ls	2'
sh	15"
ls	2'
sh	3'
ls	1'



July 26, '35  
Grand Bend

1785

38

About 300 yards south + east

(downstream) from bridge at Grand Bend:- blocks of limestone, shale and shaly limestone chiefly concentrated at the base of the bank, but also scattered through the clayey soil (till) of the steep bank. There are blocks abounding in byzonia, some <sup>glacially</sup> striated, <sup>blocks</sup> ones having the lithology of the Alpena ls. The shaly blocks with byzonia + crinoids suggest the Thunder Bay. The *C. coronatus* + *S. granulosa* remind of the lower Thunder Bay. This is true of *Cyclothana* too which was found in matrix like the Thunder Bay.

Over  
Send Mrs. Southworth  
picture of Museum +  
Mr. S. the yearbook

I would attribute the freshness and lack of stress on the exotic blocks as due to being entrained in the ice while transported and to being encased in the clayey till which would effectively protect them from wear.

A G. springeri is in Mr.  
Southworth's collection, which  
was picked up in the drift.  
Found in N branch of Thames north of London by W. J. J. J.  
What appeared to be blocks  
of the same material appeared  
downstream from the bridge  
between that structure and the  
lake.



31

July 26, '35

1786

Commander Charles Finleys.  
About 5 miles NW of Hedford.  
The Commander's house and  
the fields about are underlain  
by the hard shelly, nodular,  
shaly limestone <sup>1 1/2' thick</sup> of the upper  
Widder beds, the same as  
exposed at the small quarry  
just over the railroad tracks  
east of Hedford. Just N  
of the Commander's house  
is a small run which  
may be followed east  
deep into his fields. For  
more than 1/4 mile down-  
stream the upper shelly,  
hard bed is exposed. It  
contains *Ceratopora*, sp.  
*Concava* a, *Arthrocauthu*  
*stems*, sp. numerous.



32

Atypis, etc. Further down-stream the middle shaly beds of the Widdow are exposed. These abound in *Cyrtina*, sp. *micronatus* *Hedfordensis*, *Ceratopora*. Rarer are *Chironella*, *Cranseana*, *Leiorhynchus* and a few other shells.

Send Mr. Southworth Bryant's description of my Aspidichthys.  
Send Mr. S. pictures of Eleutherozoon.

Send Mr. S. modern *Leda* or *Goldia*; *Sphaerocystites*; sharks teeth;  
Mount *Spinifers* as pins for S's.



33

July 28 1788

According to Mr. Southworth the Marsh's Mill locality should be known as Hungry Hollow. The coarse-ribbed, new *Strophodontia* is from the coral zone.

Jones Mill and Fourth Hill  
These may be reached by going north on the Thedford road 1.8 - 2 miles and turning east into the farm. On the farm property behind the buildings is a shallow valley which can be followed down to a fall over the upper beds of the Widder which are here very thick. The ledge forming the falls

34

is in two layers, the lower one about 2' and the upper one  $3\frac{1}{2}$ -4'. These are the same as the uppermost hard beds at the Rock Glen but are better exposed. ~~The Encinal bed forms a ledge some 20-25' below the top of~~. Above the hard layer are fully 4 feet of blue Calcareous, brittle shales. Are these the base of the Petrolia?

The Encinal bed forms a ledge some 20-25' below the top of the falls. About 3' below the top of the Encinal is a limy layer in contact with the soft Arkona shales which shows beautiful ropemark-



35 rings or fucoids.

If the gully is followed downstream to the Aux Sables River, the Fourth Hill locality can be reached. This is a meander scar on the left side of the river going downstream about  $\frac{1}{4}$  mile from the gully.

Here fossils from the Arkona, Coral bed and Widder are all mixed together.

Acervularia heads are common at the side of the cut nearest the Jones Mill gully. Many of the heads are badly silicified but this is not true of the associated corals from the coral bed which are abundant about the locality.

36

The concentration of the *Aceroularia* suggests the source to be close at hand, probably from the coral bed, but the strong silicification indicates a long period of exposure. These *Aceroularia* heads may be from the drift and deposited on the river bank prior to the corals from the coral bed.

Mrs. Southworth found an *Aceroularia* on lot 8, which must have been a drift piece.

*Tropidoleptus* is common in the Eucinal at Marsh's Mills.



37

Told Mrs. S. I would  
identify specimens, sending  
all back but marking  
ones I ~~would~~ would like to  
keep.

Look up any illustrated  
papers for Mrs. S. Lives  
of Geologists

June 28

1935-1793

38

Limwood Quarry on route 61,  
SW of Davenport. Pit of Limwood  
Cement Co.

Cedar Valley { Coralville  
                  { Littleton  
                  { Limwood

~~Rock~~  
Davenport (Vith. ls)  
Spring Grove ls  
Kenwood sh  
Otis (Little ls) 30'  
Coggan 20'  
Dil.





39

June 28  
Linnwood Qy.

1794

A = About 40' of massive dark and light lithographic to sub lithographic limestone, some layers highly bituminous, others strongly brecciated

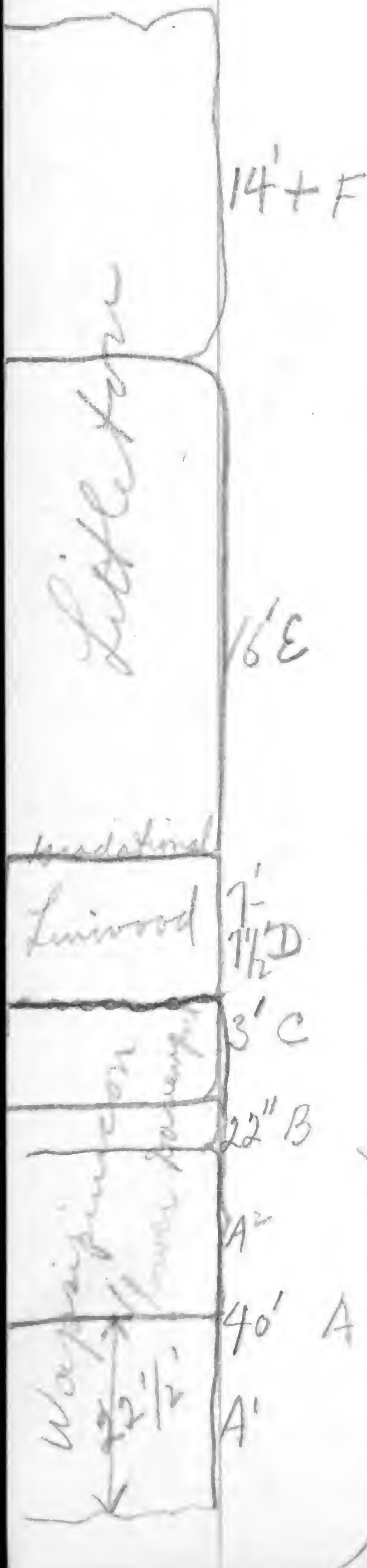
B = Smooth textured brownish gray limestone weathering rusty brown on the surfaces. No fossils seen

14' + F C = Sub-lithographic, light gray limestone without fossils. The lower contact may be unconformable and the upper one certainly is.

~~Bed~~ Beds A-C belong to the Wapsipinicon or lower Davenport limestone. Bed D. initiates the Cedar Valley.

D - Initial stage of the Cedar Valley or Atuppa Independence zone. Hard massive, heavy-bedded, fine-grained fossiliferous limestone. This rock is readily separated from that below by the presence of fossils. This is the bed from which Hypothyris has been taken. The lower 10' or thereabouts contain pebbles of the beds below.

A' - non-brecciated dark gray sub-lithographic ls. = Spring Grove  
A'' - is lighter & often brecciated





40

E. Shaly limestone containing many fossils: *Strophodontia halli*, *Schizophoria iowensis*, *Atropa bellula* (this names the zone), *Cyrtina umbonata*. This is the old Hamilton shale.

1

F - Mostly calcareous shale with few fossils.  
E and F are Littleton members.

41

Buffalo Qy

1796

Section supplied by  
M. A. McIntyre  
a little W. of Buffalo

Pentamerella Waterboensis Zone	15	6' "dolomitic", buff	Stroph. cowensis zone
	14	4' hard gray	Gastropods
	13	5-6' Buff, heavy	Large Stropheodonta
	12	6' Massive ls.	Athyris and Stroph. parva zone at bottom, <i>Sp. occidentalis</i> <i>Sp. euryteines</i>
Pentamerella Zone	11	4' Massive	Many corals. Coral reef on platform.
	10	3' Massive ls.	Limnals Stromatopora
Bellula Zone of Littleton	9	4' Earthy ls.	Small Chonetes.
	8	2'	like below
	7	2-3' Earthy ls.	Numerous crinoid stems (majesticus)
	6	4' Earthy ls.	Schizophoria a
	5	3-4' argill. ls.	
	4	3' Argillaceous ls.	Small Streptelasma
	3	10-12' Earthy ls.	Athyra bellula 35
		<del>Littleton</del>	
	2	Lowood member	gray ls. Phillipsastraea, A. profunda, This
			3-4' A. independence - bed D of
	1	Davenport	8' Lowood Qy.



42

Ind Big Creek S. of Buffalo  
150 yds above highway Pl. 1797

3.7 miles S of W. of Buffalo

Top of Devonian

5-6' Coralville - dolomitized limestone  
with ~~altered~~ Stomatopora and  
with Cranaena at the base

End of A. waterlooensis zone

Heavy  
massive  
dolomitized  
limestone

8' Spirifer capax. (type locality)

Dolomitized  
ls.

4' Finer  
bedded  
than  
below

Shaly  
ls

3-4'

Stroph. iowensis zone

43

The *Eatonia gregaria* of Belauzki  
suggests Leiorhynchus

1798

*Paraphorhynchus elegans* Belauzki  
suggested: *Hypothyridina*

Bornow, Lake Cy. cephalopods which  
suggest lower Alpena (Whitefish Bay).

McLellan's clearing for *Goniatites*

See *Cyrtoceras dictyon* White-like.  
Campbell's at Falls of Ohio. Cyrtoceroid  
with beautiful ornamentation.

*Heliophyllum confluens* = *Billingsotheca*

Stop at 1 mi. NE. of  
Laurens, N. Y.

Prism for reversing pages

~~Send out Cat Types Amer. Mus.~~



June 29.

1799

44

1.3 miles W of Middle Amman, Ia.

June 30

Iowa City

End of Iowa Ave; bridge

About 13 feet of heavy-bedded lithologic limestone containing a large snail (*Planorotomana isaacsi*) and *Spirifer urbanus*. About 4' from the top of the exposure is a zone of *Ediostrophia*. This is almost the top of the Cedar Valley. At places the beds have been truncated. There is a second zone of *Ediostrophia* at the base of the section.

See Johnson Co report for full thickness of Coralville. Well seen in quarry behind (West) of fine arts Building.





45

1800

June 30'  
Sec 30, Newport Twp., Johnson Co.  
80N-8W.

A - *Athyris vittata* and *Sp. asper*  
zone of the Littleton-Rathen  
Coast shaly limestone

B - *Pentamerella* zone of the  
Littleton containing. Mostly  
hard shaly limestone abounding  
in corals.

10' B.

6' A

11  
2



June 30<sup>2</sup>

1801

46

West edge of Solon village on  
road to Cedar Rapids

A = rather shaly nodular limestone  
about  $14\frac{1}{2}'$ , weathering to ash gray.

*Schizophoria meeki*

*Sp. novensis*

*Stroph. subdennosa*

*Eypidula occidentalis*, + *comis*

*Atrypa independencis* (zone)

*A. occidentalis*

*Cranidia thomas*

*Productella belanskii*

*Stropheodonta costata*

*Billingastroa*

*Accrularia*

*profunda*

zone  $5\frac{1}{2}'$

B. more solid shaly limestone  
with *Accrularia profunda*.

*Atrypa*

*independ*

*encis*

zone

A

$14\frac{1}{2}'$

All part of the Linnovod  
member  
2 pictures

June 30<sup>th</sup>

1802

47 NW Sec 26 (Big Grove) - 81N - 6W.

30-35' of hard bluish limestone,  
a little fossiliferous. *Pugna* fossils are  
at the base. Belongs to Bellula  
zone. *Sp. Cedarensis*. Benton Co.

June 30<sup>th</sup>

St. 2.

~~W. Valley~~ Bellula zone

All quarried away  
no St. 2. left

State Quarry beds.

About 10-12' of *Brachiozod* buccia,  
gray, thin bedded limestone abounding  
in *Pugna* fossils, small *Atrypa* etc.  
These beds fill erosion channels  
in the Cedar Valley and overlie  
different stages. The beds here  
overly the Bellula zone.



June 30<sup>5</sup>

1803

48

By one mile N of Ely on road  
from Glou - Cedar Rapids  
Glou basal Cedar Valley over-  
lying Davenport with pebbles  
of the latter in the Cedar  
Valley. *A. independensis* is  
abundant. *Gypidula conica*,  
*Schiz. meeki*.

July 1804

Qy in mid sec 33, 86 N-8W, Grant Tn.

49

Small qy. showing top of independ-  
ence zone of Linwood about 5' and  
some 5-9' of profunda zone. Upper  
3' of this zone here contains abundance  
of Nerobania. Bellerophontina common.  
Fracture hard buff ls. with much  
X in calcite in cavities + seams.

July 1<sup>st</sup>.

2 miles east of Central City

About 30' of Otis, thin bedded,  
blocky fracturing when weathered.  
The beds run one inch to three inches.  
Lower beds massive, a foot or  
more thick.

July 1<sup>st</sup>

About 1 $\frac{1}{4}$  miles E of Central City on  
creek. Hard heavy-bedded  
massive dolomite, buff, finely granular  
or like table salt in texture. Many cavities.  
The Silurian is probably lower. Logan.

July 1<sup>st</sup>

See Norton Lign  
SE  $\frac{1}{4}$  sec 28, Jackson Tn., 86 N-  
6 W.,  $\frac{1}{4}$  NW of Central City. Along  
Wapsipiconic R.

Otis

20' B

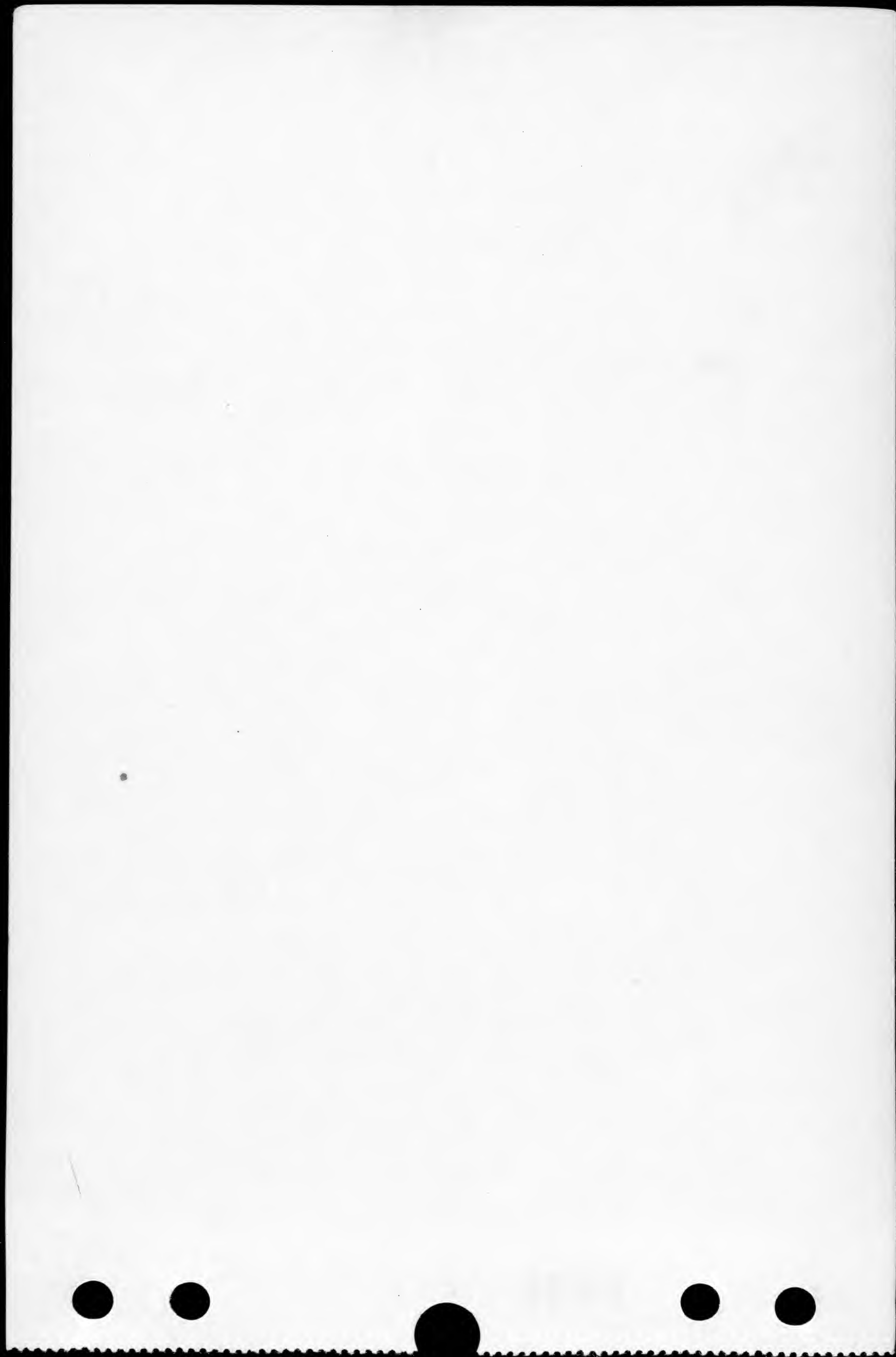
A - About 15' of fine-grained  
dolomite, yellow gray or buff.  
Contains innumerable impressions  
of a small Spinifer, Goniatites.  
Suggests some part of the  
Detroit River series.

Logan

15' A

B - bedded, hard Otis.





July 14 1895

50

Section on Indian Creek, back of  
Country Club in Kenwood Park, Cedar  
Rapids

A - Sub-lithographic ls. brachiopods  
at top. 12'. Otis

Davenport

12' D

B - Bluish shaly ls. + sh. Type  
section of Kenwood sh.

Spring  
Grove

18' C

C - ls. sub-delaminatic, thin-  
bedded at top, massive at base  
Spring Grove

Kenwood

20' B

D - Lithographic brecciated ls.  
lower surfaces irregular  
Davenport ls.

Otis

12' A.

This is the Kenwood section  
of Norton in Linn Co. report.  
Norton said Kenwood  
correlated with Independence sh.  
These are all divisions of the  
Wapsipinicon



July 2,

1806

51 94' 100 yds E. of bridge over Cedar  
River on Island - Shellburg sh.

10' Waterhousei zone

6' Pentamerella zone { Many corals.  
Ocellularia  
davidsoni

11' 17' bellula zone bluish compact  
ls, weathering shaly  
Gonphoceras zone at base\*

16' upper Limwood (Profunda zone)  
Gastrophylum a. Billingsastraea

\* There is also a cephalopod  
(Syrocceras zone) at the base of the  
Limwood.  
all fractured ls.

both





1808

Some Triassic beds of Vassar

52

Qy on Nichols Farm.

near Vinton

About 35' of brecciated ls.  
of the *independensis* zone  
abundant in the sp. *independensis*  
Near top of Qy *Neuberia* common  
2'-3' of *Rufunda* zone at top of  
Qy.

Reat

A - about 6 feet of brecciated  
Davenport

Linnwood

5-10' C

B - rubbly ~~ls.~~ limestone  
breccia with knobs and cobble-sized  
pieces of ls.

Rubbly  
brecciated

10-15' B

C - bedded ls. of the *Gyneria*  
beds of the basal Linnwood

Davenport

6' A

Over the bank and in the  
river bank the Spring  
grove is exposed below  
the Davenport.

Spring  
grove

In the breccia (B) occur  
worn pebbles of buff ls.  
containing *Albugo* *independensis*  
This suggests that the breccia  
bed (B) is a basal conglomerate  
of the Cedar Valley. Contains  
also quartz pebbles 2" across.

1809

53 Bed B is entirely a limestone  
breccia not unlike the ones  
found in Quebec.



1810

54

July 3

Paie Creek NW cor sec 28, Liberty Twp,  
T 88 N - R 8 W., near Quasqueton, Ill.

loose

In stream is exposed  
horizontal independence zone  
for some 75-100 yards. Then  
comes steeply dipping beds  
containing Newberria & corals. On  
top of these and surrounding the  
blocks is soft sh with *Dorvillea*  
belonging to the Independence sh.  
This shale contains shale pebbles  
& broken fragments of ls. About  
a rod upstream from the dipping  
beds is flat independence again.  
About 5' vertically above the  
dipping exposure and 15' down-  
stream the flat-lying Newberria  
beds are exposed. It suggests  
a cave-in of the Newberria beds.

Stainbrook thinks, on the other  
hand, the dipping beds are  
thrust ed lower beds of the  
Byroceras zone of the  
Independence. ~~The zone carries~~  
The Newberria bed carry *Pillips*  
*astraea*.

55

Pine level

Poor Farm

1811

Chadwick  
subsoil

Reverend  
Buckley

roads to the  
definitely valley  
between

just  
sh.

Chadwick

definitely Reverend



56

Volga River at Eagle Point  
Sec 31, 9° 3' N 8° W, Westfield Twp.

Shows at base a few feet 3' of Spring Grove platy limestone followed by about 10' or less of Davenport breccia. Then comes a heavy bed of breccia 10-12' cemented by limy shale & shaly ls. Contains pebbles of the Davenport. This is followed by about 50' of Cedar Valley containing the Pinewood, and some of the Littleton.

Eagle Point section of Fayette Co. Report.

July 4 1813

Waterlovensis zone suggests  
Partridge Pt.

57

Section at dam on  
Wapigwicon River at Littleton

A = Profunda zone exposed  
just above the water

B = Bellula zone - here  
reduced to 2' feet. Carries  
large curved cephalopods

C. Pentamerella zone -  
abounds in A. Davidsoni

D - Waterlovensis zone

Water-  
lovensis 12' D

Pentamerella 4' C

Bellula 2' B

Profunda 3' A





1814

July 4.

58

Saw two sections of Independence shale on Linn Creek. In each case ~~there~~ the lower contact of the shale was not visible. Lateral contacts showed the profunda zone. Every section we have seen <sup>except</sup> the type quarry at Independence suggests that the Independence shale overlies the Cedar Valley. The Poor farm was the only section showing Davenport in possible contact with the shale and here it seemed to contact laterally with Cedar Valley breccia. In no instance was regularly bedded shale seen.



(60)

July 18, 1936 1815

Exposure of Upper Widdow  
about  $\frac{3}{4}$  mile east of  
Oppenwash beach.

AA Soft limy shale with  
*Athyris*, *Charionella*, *Pholidostrophia*  
*L. levis*. Thickness unknown

A. Hard, brittle shaly ls.

6'	E
9"	D
7-9"	C
5-8"	B
4"-5"	A
	AA

B. Contains *Pholidostrophia*,  
*Sp. Thedfordensis*

C. Abundance of *S. levis*,  
*S. Thedfordensis*, *Athyris*. Small  
amount of chert, large *Orthoceras*.

This is the upper Widdow, the  
same bed exposed at  
the top of Rock Glen, Jones Hill,  
along the R.R. and at the bend  
about 1 mile east of Thedford





(62)

1816

D. Large *S. concava*, *S. denissa*,  
*Athyris*, *Brigozoa*, 'large Cephalopods  
Contains much ~~dark~~ brown  
chert.

E. 6" brittle brown weathering ls.  
with *S. Redfordensis*, *S. denissa*,  
Very little chert.

The limestone as a whole  
weathers brownish both on  
surface and inside. This  
exposure is only  $\frac{3}{4}$  mile  
east of the beds at Appewash  
Beach. The dip on the west  
edge of the exposure is  
rather sharp ( $2^{\circ}$ - $4^{\circ}$ ), which  
might mean a considerable  
thickness of rock, ~~the~~ Petrolia,  
between the two.

(To W)

9586

9571

1.5



(52)

Silica point  $2\frac{3}{4}$  miles West of Apperwash exposure.

About 2' of limestone with dark gray to black flint, rusty brown on surface. Limestone with *Chonetes* (*vicina*), *S. demissa*. Below the ls. is blue shale. (sample taken). This bed might represent Wanakah.



West bluff of Kettle Point, the Silica Point section appears again, 22" thick. The bottom of the bed contains the channel fillings with pyrite. In the lower part were found *Tropidoleptus*, *S. granulosa*, *L. perplana*.

In the upper part of the limestone *C. vicina* is abundant with *Homalotretus*, etc.

The black shale (Huron) lies directly on the Silica Pt. ls. and is in a low basin

1 1/2 mi. N of  
Shawano Creek

1



(63)

of the Silica Pt.

1818

Silica Pt.



"Shawanaw" Creek lies ~~just~~ SW of the outcrops. The outcrops is about  $\frac{2}{3}$  the distance from Kettle Pt. to Shawanaw Creek. Flint indicates unconformity.

Ippawaish - Stony Pt.

Upper beds contain a small *Stropheodonta (plicata)* suggestive of Michigan.

64

Silica, Ohio

1819

A -



Silica sh.

E

B - Fossils seen in place  
large Schizophoria, Leptodoleptus n.

6" limestone

D

Blue sh.

C

C. Contains many Leptostrophia  
several of them small.

Blue ls.

B

Columbus

A

D. Contains Lingulites, Cornulites  
etc.

E. The Silica shale.

F. Large Leptostrophia, common  
in the hard earthy limestone

G. between the heavy ls  
I and the thinner bed H.  
occurs a blue shale abounding



1820

(65)

in *Rhipidomella* and *Strophodontia*  
*Platystrophia*, sp. *nummularis*.  
 Dip on  $S 4\frac{1}{2}^{\circ} N 75^{\circ} W$ .

H. - Thin limestone 9 inches thick  
*Ambocoelia*

L. Abounds in *Ambocoelia*  
 and *Leiorhynchus* is rare.

H & L go together. The upper 4" is shaly and the *Ambocoelia* weathers out

Correct reading

compass set

$N 99^{\circ} E$

66.

July 20<sup>th</sup>.

1821

## 10 - Mile Creek Section

Section is located on 10 mile Creek just below or south of the Medusa Cement plant. The section runs west of the highway bridge. First rock exposed is about 75 to 100 yds west of bridge. This is upper part of Columbus limestone showing the *C. coronatus* beds ~~and~~ definitely and probably also the blue beds, although I did not definitely see them. After the Columbus exposures there is a long covered interval showing no exposures in the stream-bed. Along the bank there is much blue clay which was dredged up. I judge there is an eighth of a mile of the blue clay in the covered interval. ~~The~~

The first ls exposed is a hard blue limestone abounding in *Leiorhynchus*. From here for another eighth of a mile exposures are nearly continuous. The rock dips at a low angle, I guess about 4° to the west. and in all



1822

(67)

between 20 and 30 feet of  
limestones are exposed. Some  
of the stone contains white  
chert and most of it is  
greatly dolomitized, fossils  
occurring as impressions.  
Fossils are hard to get. In  
addition to Stauffer's list we  
found Cyclabina, Reticularia,

There seems no doubt in  
my mind that these beds  
belong to the Centerville  
horizon, but I doubt if the  
Sp. beuratus occurred with  
the Leiorhynchus, my guess is  
that it should come above it.  
Mr. C. found a large  
Leiorhynchus loose.



68 Page 1

## Distances

Up Days by Race

10 Mile Creek, Silica / Ohio

Strike  $N 75^{\circ} E$  / Dip  $S 15^{\circ} E$   $6^{\circ}$

Sept 7, 1936

145-1

K A - First outcrop going upstream from  
bridge Buff colored dolomite filled  
with casts of an old stem segments

301

25'

30

150

1130'

201

800

85'

130'

100'

160'





1824

Page 2

69

Sept 7, 1936

10 Mile Creek, Silica, Ohio

F - Dense blue-gray fine grained limestone with many *Leiorhynchus* & other fossils - 25' interval in stream bed covered with loose blocks, none seen in place - *Leiorhynchus* *Chonetes* small, *Strophodonta*, *Microspirifer*

G - 130' interval in stream bed of blocks of blue shaly ls. resembling Blue beds of Silica G. & blocks of *Leiorhynchus* beds scattered about - Blue shale on banks soft & full of pyrites, probably Silica Shale

Glacial debris

G' - A number of scattered blocks of brownish buff granular ls. without fossils

H - Bluish gray siliceous ls. with cherty nodules

H' - White chert

I - 25' grey dolomite

550'

L

J - Siliceous grey ls. & chert

K - Dolomite buff colored with casts of crinoid stems

K' - 60' covered interval Blue Shale on banks

L - Dense purplish blue dolomitic ls. To top of section where glacial striae are. *Strophodonta*, coral & crinoid casts

60' K'



belly  
movs

Land

some. Iron

alpine

barrier

David's Note:

Massive

Strong

massive

New

barrier

Bell

Strong

RC <sup>partially made</sup>  
<sup>from</sup>  
<sup>concrete Eifel.</sup>

Log. = Cont.

5 tri.

Eifel + Dunkel = Marcellus

511

Columbus in part

Collier  
Excav.

Lois Blum = Schabauer

1825

(79)

Section 3/4 miles N of  
Bumbers Hill on Pike Creek.

A. Hard dolomite with abundant  
chert.

B. 4-5 feet granular ls. the  
lower 2 feet fine-grained  
light yellow or cream,  
very thin bedded. Upper

half more massive, harder  
with more corals, varies from  
green gray to white or yellow  
See Kindle for list

Hamilton  
4-5'

Silurian  
10'

To reach this place take U.S. 31

to bridge over Pipe Creek. Turn  
left ~~at~~ bridge and follow  
dirt road along creek to next  
bridge over creek. Best exposures  
are about 100 yds downstream  
from bridge on N side creek.  
The exposure is in Miami Co.



1826

(71)

Qy. of France Limestone Co.  
at Kenneth about 4  
miles West of Logansport.  
Only Silurian seen.

Section 100-150<sup>yds.</sup> downstream  
from Georgetown bridge.

A - Sugary yellow limestone,  
hard, heavily-bedded, discontinuous  
laterally. Few fossils.

Granular  
ls. varying  
in hardness

B { 9' maximum B. Overlying the sugary  
limestone or the Silurian is  
finer-grained, earthy, brownish  
or buff limestone with  
many corals <sup>Stromatopora</sup> and a few  
other fossils. Retikulina,  
Craneana, Atrypa (fine-lined)

Silurian  
10' ±

Platy. dol.  
Limestone

Sp. venustus (about 1' above Silurian  
in fine-grained, hard limestone  
This limestone for the lower  
7' is hard but weathers  
into small lumps, giving the  
cliff face a blocky appearance

The upper 1-2' is thin-  
bedded granular (coarsely) and  
abounds in at least two  
species of large Spirifer.  
One of these, a Cyrtospirifer  
must have been confused  
by Liddle with Sp. acuminatus



(12)

Little Rock Creek near  
confluence with Wabash River

81 paces upstream from bridge  
appears first Devonian, below  
is gray Silurian dolomite about  
5' thick.

On top of Silurian is 20" of  
blue granular limestone with  
*Spizfer divanicatus* (venustus)  
Then follows 18" of thin-bedded  
granular buff limestone with  
*Sp. granulosa* and *Rhipidomella*.

~~82~~ brittle ls  
7'?

covered

3' - Hard gray  
limestone

18" *Sp. granulosa*

20" *Sp. venustus*

Sil 2.

On this are 3' of hard  
gray massive fine grained  
sandy limestone with fossils  
hard to get. This measure  
may be excessive owing to  
dip upstream.

The rock is covered for a  
short distance in the stream  
then follows brittle shaly  
limestone with *C. manitobensis*,  
*Leptostrophia*, *Stropholonia*.

The lowest bed in this  
section may actually be  
Devonian but we could  
not prove it.



73

Deer Creek about 1828  
1/2 mile east of Delphi

Hard heavy-bedded dolomite in bed of creek, about 3' showing. On section gray or brownish gray with *Sp. mucronatus*, small *Chonetes* and *Pentaculites*.

France Co. Ky Section in Quarry 3 miles east of Logansport on Highway US 24

Cap coral  
broken  
14'

A. Silurian on east wall quarry 30' of brown or yellow dolomite with *Halysites* and *Leptaena*.

Strom.  
15'  
broken

B. Hard, massive limestone, a cemented mass of *Stromatopora* club-shaped *Favosites* with an occasional *Prismatophyllum*. I believe the Devonian begins with this limestone. Mud green clay with *Stroms*.

Silurian  
30' ±

C. Jumbled mass of cap corals, sheets of *Stromatopora*, in which this layer is thin bedded and more rotten than the lower 15' bed. This is the

floor

1829

(74)

bed that correlates with upper layers at Pipe Creek. Corals are abundant but poorly preserved. The whole structure is that of a reef below and coral plantation cemented by animal debris.

Kindle calls the Stromatopora bed a limestone bed with calcareous concretions.

Send Mr. Campbell Swartz on ~~the~~ Chattanooga shale.



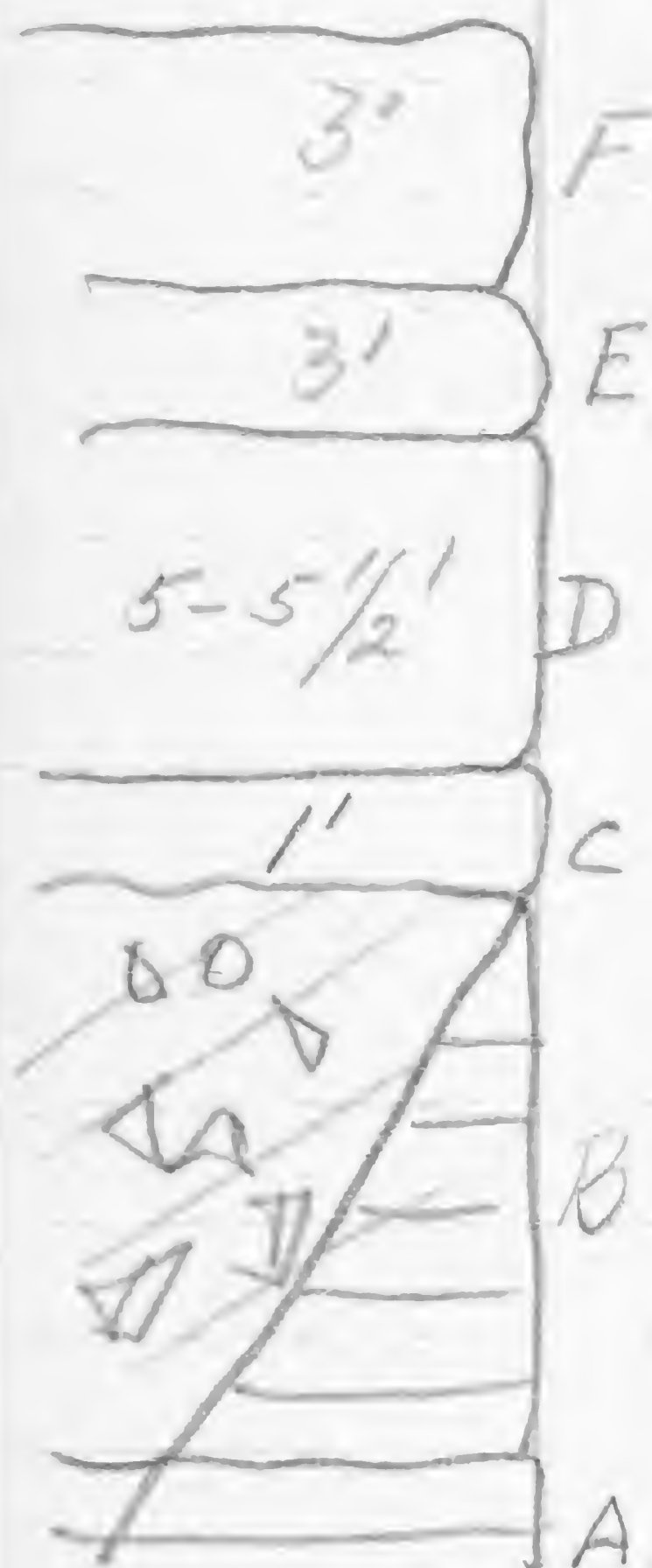
1830

75

July 24

Section on Pipe Creek from bridge to dam at Falls.

A Just upstream from the bridge there is heavy-bedded (beds 3" thick) light gray dolomite with *Chonetes*, *Leptaecya*. About 1'-2' under the bridge, here the dolomite dips to the north at a low angle.



B. Upstream to the dam the dolomite is brecciated and in heavy layers 1' or more thick. In places bedding is not clear. The whole dips at a low angle to the north. Over this the Devonian lies unconformably.

Traced downstream ~~for~~ a few rods the breccia becomes thinner bedded and flattens considerably. At the bend of the stream just below the bridge the Silurian is nearly horizontal and rather evenly bedded in layers up to 8" in thickness.





76

C. Hard sandy limestone containing *Pachystrophia*. Light yellowish in color. One foot thick, unconformable on B.

D. Hard, massive light gray fine-grained limestone abounding in *Stromatopora* and a few other corals. 5-5½'

E. Three feet of thin-bedded limestone weathering into flat plates. granular, gray. Contains many corals, brachiopods and a few stroms.

F. 3' of hard coarsely to finely granular ls. variable in color gray to yellowish. many fossils. Upstream 100'-200 yards forms bed and banks of Creek.

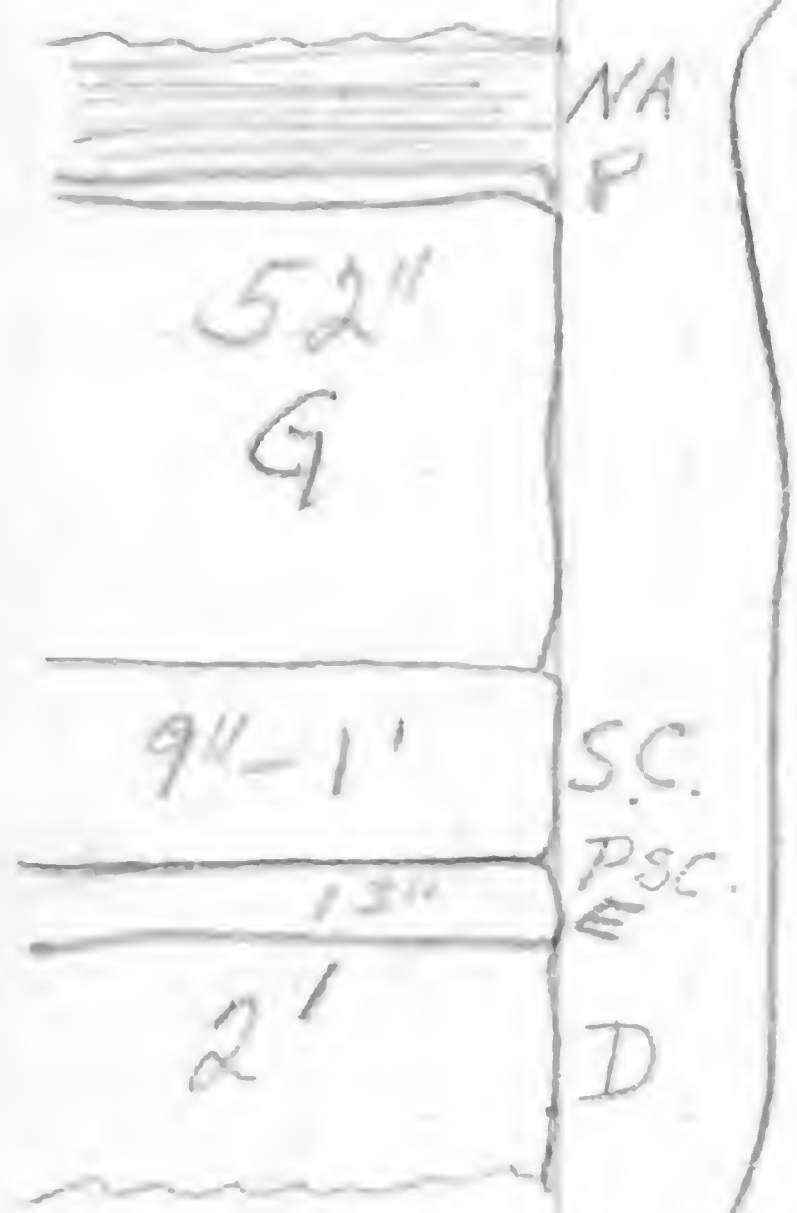
On the cliff the Silurian is cut away under the Devonian ss. leaving the latter and the upper layers as an overhanging ledge.

77

July 25

1832

Section on Hay Creek about  
4 miles N of Lexington on Hwy  
Ind. 56. On ~~Ross~~ Lawson Reiff  
farm, Indiana



D - 2' of hard blue limestone  
weathering shelly, contains *Athyrid*,  
*Stroph. deflexa* type, *Isocrurus* type  
*Leptæna*, *Cyrtina*, *Rhipidomella*  
*Sp. bygonia*.

E - 13'' hard bluish ls. with  
*Cyrtina*, *Pholidostrophia*. Wide lingual *Spina*.

P.S.C. Thin layer of pyrite 1/4"

SC. - Silver Creek, few fossils  
blue, brittle shaly limestone

G - Hard blue limestone  
lower 6''-1' with *Rhipidostrophia*  
and *Chonetes coronatus*.

Upper 3' with large *Athyrid*,  
*Leptæna*, *Stroph.*, *Isocrurus*.  
Thickness of this bed variable  
from 3'-4'.

P. - 1 1/2'' of pyritiferous ls.

NA - New Albany sh.

The Cyrtinae belong  
in E. So E here  
is all of 2' thick.  
See Sec. 1/4 mile N of  
Big Creek  
which is correct.



(78)

Bruce Hardy 1833  
Quarry 4 miles W of Lexington, Ind.  
at intersection of Ind. 3 & 56.

Indiana

G - 1 1/2' Hard blue gray limestone  
Silver Creek 2'-8" Shaly limestone

E 6'-8" Hard blue gray ls. with Cyrtina

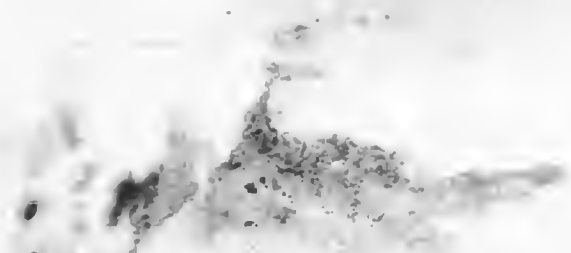
D 13' Hard blue gray limestone

ABC Onondaga

In this section the Silver  
Creek is very variable, thinning  
to disappearance but thickening  
up to about 8" in places.

(79)

Section on Ind. 3, about  
1/4 mile N. of Big Creek  
Indiana 1834



20"

2"

G bed, hard with *Rhipidoleptus* about  
6" above base

30"

E

F. About 1/2-2" of sandy <sup>brown</sup> gray  
limestone with *Chonetes*  
*Yundellanus*

D 7'

D

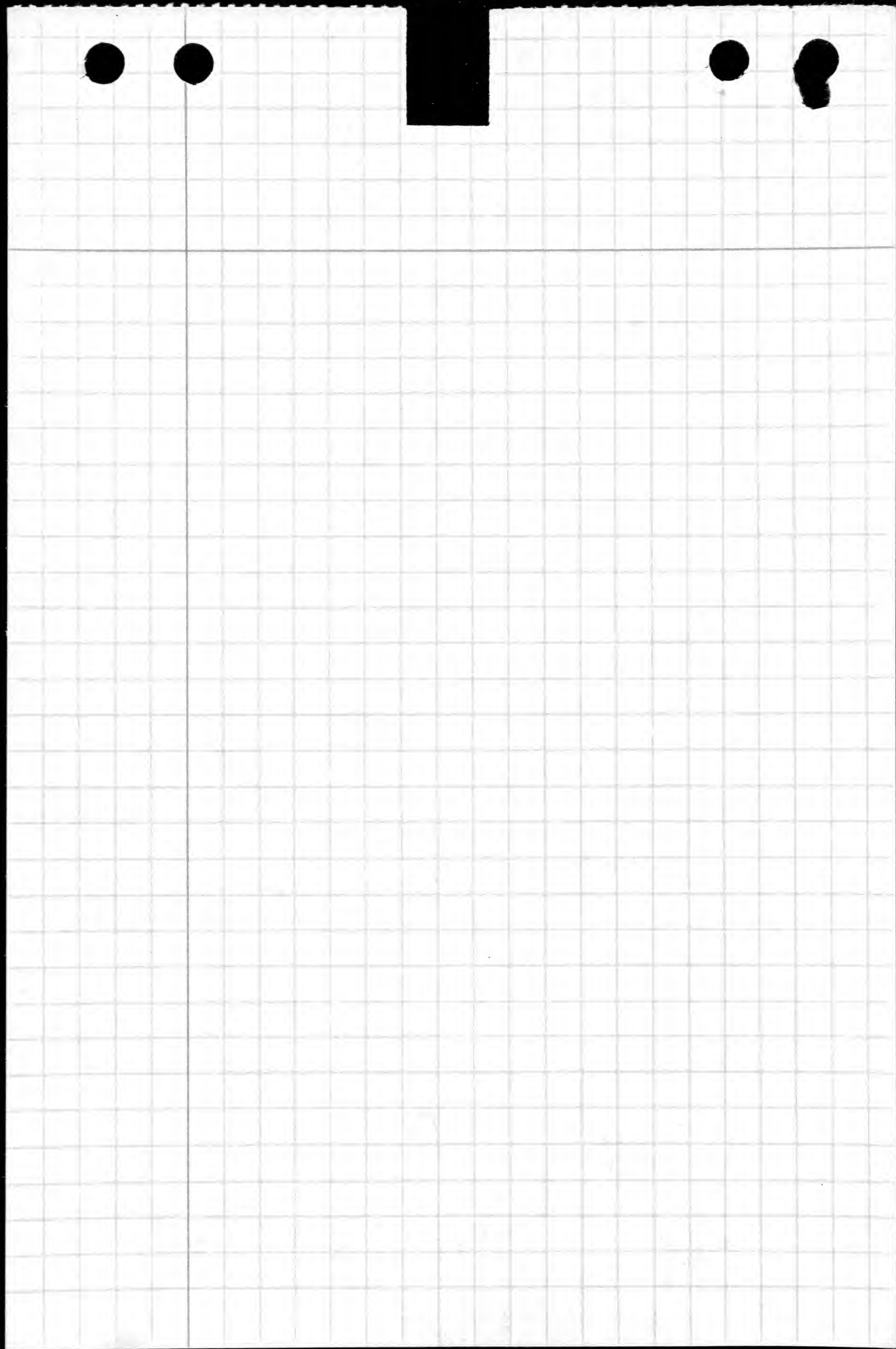
E - Fifty inches of hard blue  
finely granular ls. beginning  
with a bed of *Cyrtina* and  
ending with a bed of *Cyrtina*.  
Weathers light gray

D. Hard blue limestone  
weathering to light blue, 7'.  
Contains abundance of  
fossils more evenly  
scattered than in E.  
*Rhipidomella*, *Athyris* etc.

Sp. 5' +  
acuminate

C.





1835

July 26

Sent Mr. Campbell a lot of odd small boxes for casting plaster.

Illinois

July 28 = June 25, 1935

3 miles due west of Mill Creek, Ill. Section about 290 feet upstream from road. Here there is a tilted block (or blocks) in stream bed and bank showing the following section

A. - hard firm shale 18"

B. - soft shale 18"

C. - harder sandy bed 15"

D. - soft shale 15 feet

Covered?

E. - tumbled blocks of hard finely granular gray limestone in tubed beds, one 18" with *Tropidoleptus*, another 3' with crinoid stems. A third 18" block had *Vitulina* and *Centronella*. This may belong with the *Tropidoleptus* blocks.

75 feet ~~upstream~~ from the end of this exposure is a big block of sugary white ls. with *Centronella*? ss. was seen on large blocks further upstream.





1836

81

These blocks appear not to be far out of place. The bed of the creek is <sup>filled</sup> mostly by Clear Creek Chert

2

Section July 28<sup>1</sup> - June 25, 25<sup>2</sup>

3 miles WNW of Mill Creek, Ill. 1938

A - Gray (light) Mersenne shale with *Lecorhynchus*.

B - limy sandstone without fossils.

C. Yellowish to blue shale  
E. at least 5'. Only fossil seen is *Elythra*

Covered? C + D = 14'

D: hard, shaly weathering ls. gray, fine-grained, much chert, at least 5'

E. 28" hard blue gray limestone with chert in upper beds. At base contains *Centronella*, *Vitulina* and *Trigondoleptus* in abundance. *Sp. sculptilis*.

Upper beds less fossiliferous but contain *Leptostrophia* and *C. coronatus*. Scattered corals all through the bed.

6' + ls with chert

2 1/2

covered 1 1/2

1 1/2"

covered 3'

28"

xxxxxx

↑

x

↓

limy ss 2'

Mersenne

shale

17'





82

F. light gray shaly weathering limestone  $1\frac{1}{2}'$  with bryozoa, Schuchertella, Cystodictya common  
Flint nodules  
Covered  $1\frac{1}{2}'$

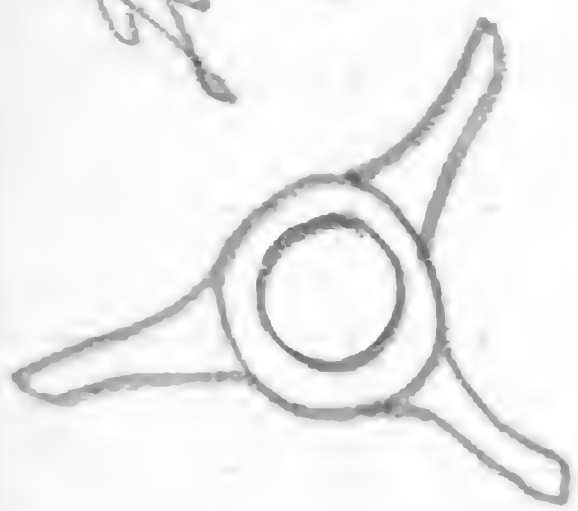
G.  $2\frac{1}{2}'$  shaly weathering, gray finely granular limestone with scattered chert.

The next 6' are mostly covered but showed two limestone blocks of rather massive stone abounding in flint and coral debris. &

On the slope above this last block no ls was seen, only siliceous shale and chert/slabs showing no fossils. The Hamilton ls appears thus to be about 16 feet thick at this place.

By hand level there are 18'

This is a common  
crinoid segment in  
these rocks.





3 2 5  
5 3 0  
3 5 8  
1 1 8  
2 1 7  
4  
2 4 151  
12 7 174  
1 2 4

1  
x

1838

Section near Mtn Glen

J. 25 2. of 1926 notes

83

A. 2' hard massive ls.

B. 4" shaly hard ls. with *Ammites* and large *Leptaena*

C. 7" hard blue brittle ls. with *Spurfer*

D. 21" brown gray granular corals.

E. 18" brown gray ls. with corals a. and a layer of chert 6" below top.

F. 15" corals abundant

G. 30" corals abundant

H. 55" Corals scarce, other fossils common. *Microcyclus* was found within 3' of the top. Called G in package of fossils

I. Hamilton with *Conallites*, *S. gossardii*, *C. coronata*, *P. cana* etc. Was unable to determine exact position of *Tropidoleptus* but it seems to be at the base

Sandy shale chips are present

6-7'±

Covered  
13'±

3'±

55" H

30" G

15" F

18" E

21" D

7" C

4" B

2' River level



(84)

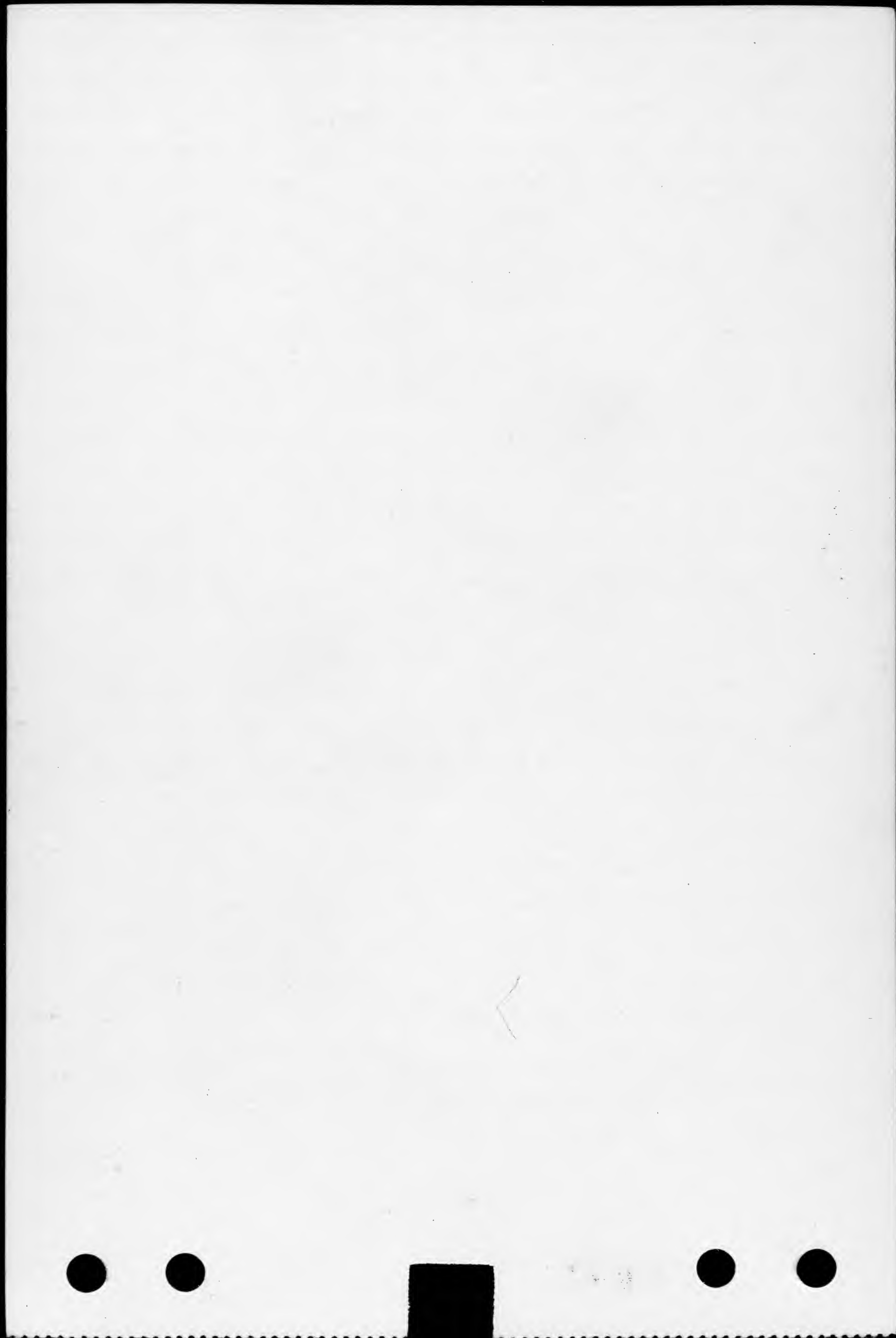
in the rock above the  
Hamilton.

~~The dip on the lower bed  
is 2-4° to the East NE.~~

Dip & strike S 27° E 11½° E.

Judging by the topography  
the covered interval here  
must be shale.

Correct compass  
for declination set  
here at E 90° N





1840

(85)

July 29. <sup>correct compass N</sup>  
reading. was set <sup>90°</sup>  
E

Hamilton Section at Bake Oven

Dip and strike N60°W 27° N 30°E

5' #

G

A - The uppermost layer of the  
Grand Tower is taken to be a  
massive bed of very uneven  
surface, containing a *Spinifer* like  
*Sp. gregarius* or *S. lucasi*.

5'

F

Covered  
13'3-  
4' #

E

B - *Microcyclus* beds - ~~the lowest~~  
~~foot~~ This is somewhat shaler <sup>weathering</sup>  
than the Onondaga beds and  
differs in fauna. The lower foot

D

*Atthis*,contains *Leptaena*, *Schizophoria*,  
*Chonetes* a. The second foot  
contains small horn corals,  
*Schizophoria*, small *Chonetes*  
abundant. The next two feet (4)

C

contain small lamellose *Spinifer*  
*S. formosa*, *Schizophoria* c, *Phacops*.  
This 2 feet contains two thin  
shaly zones. The next 26"

B.

interval contains *Schizophoria* a,  
cup corals c, small lamellose  
*Spinifer*, *Strophodont*.  
The next 26" interval contains  
*Microcyclus* at the top, *Strophodont*.

A

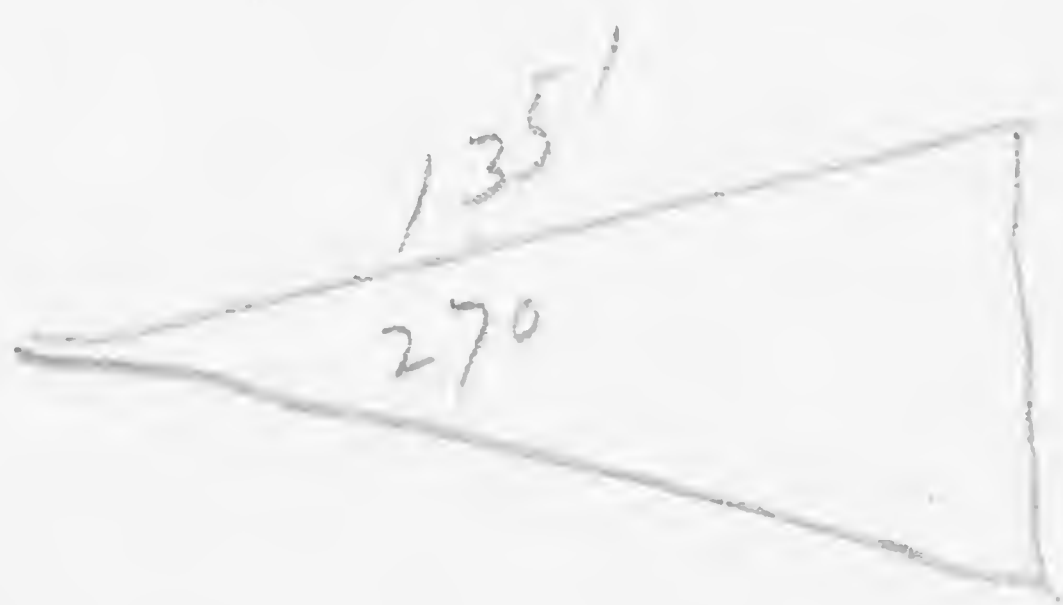
*Paracyclus*, small *Chonetes*

9' 6"

~~Microcyclus~~

9' 6"

Grand  
Tower



$135^\circ$   
 $270^\circ$   
 $675^\circ$



86

C. This interval is composed of hard brittle limestone, dark blue gray. Fossils appear less abundant than below. Small Chonetes, small Schizophoria, Phacops.

D. About 3-4' of brownish hard limestone abounding in *C. coronatus*, *Tropidoleptus* etc. Upper foot shaly, with *Spirifer* & large *Ceph.*

E. 13' covered

F. 5' of hard dark gray limestone weathering to shale-like slabs. Beds in three heavy layers. Small Chonetes abundant in lowest layer. *Tropidoleptus*, *Spirifer*, *Ravosites* in uppermost bed. Chert

G. Shale ls, nodular with chert *Sp. murronatus*, small Chonetes.

The horizontal distance from top of A to top of F is 135'. Horizontal distance of covered interval is 38'.

(Brasilethia)  
in middle  
bed.

4067  
135  
20335  
1220  
4067  
5995  
20  
34

1842

87

July 30  
Revisited Balce-Oven.

Horizontal distance from top of Onondaga to top of Trilobites bed with *Spurifer* and cephalopods is 65'. From Trp. to top of F is 60' - Total 125'. Covered interval is 50' horizontal.

Measured with a staff I made the thickness (Total) from top of A to top of F 44' = 47

Section measured with rod.

A - 65' +

B - 10'

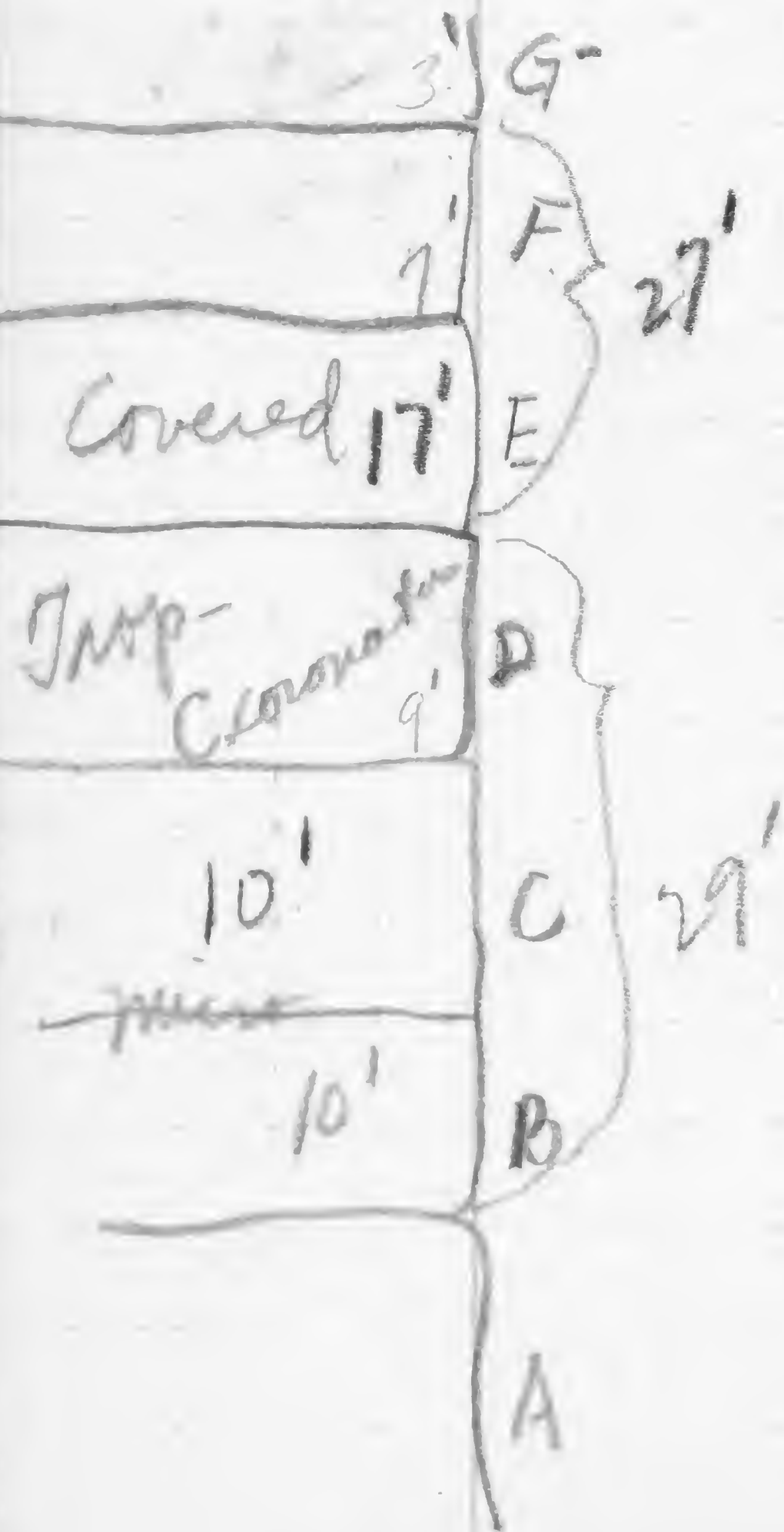
C - 10'

D - 5'

Covered 13' to 18' chert = 17'

E - 5'

F - 3'





88

July 31.

1843

Section of sandstone about  $\frac{3}{4}$  mile north of Boardman School. Sugary sandstone, friable, white or weathered light reddish brown. Contains small and large cephalopods a wedge-shaped clam and a trilobite.



Section going north over hill  $\frac{1}{2}$  mile West of road to Boardman School.

Lowest five feet in hand ground, blue limestone at base were seen *Mucrocrinus* and crinoids. At top corals appear and chert. Lower half of next hand-level interval with *Favosites* and small tabulates (digitate) upper half grayer finer limestone.

3rd. Hb. step - finely granular light gray ls. with abundance of *Paracyclas*, and *Cyrtina umbonata* (which may be a *Spinifer* related to *Sp. gregarius*). No corals.



89

4 H.L. Light blue gray finely granular ls. with *Foramifera* at top.

5 H.L. - in the lower part *A. spinosa* and *Schizophoria* appears. Also many *Cephalopods*. Hard fine-grained blue ls.

6 H.L. - fine-grained blue gray lumpy ls. abounding in *Schizophoria* and *Schuchertella*. *Phacops* c.

Schizophoria

beds.  
33'

7 H.L. *Schizophoria* abundant, small corals common.

8 H.L. same

9 H.L. "

10 H.L. "

22'

Section runs up hill N of house at site L bend of road about 1/2 mile west of Boardman School road. Dip 4° to E

Des Moines ss.

Fine exposure on south side of Little Saline Creek about 1/4 mile, about 30-40 feet dipping 22° N 10 W. The outcrop is divided into two parts by an erosion channel. On the north side of this channel *Newberrias* are common. This would be about

Correct exposure  
set here at fine of  
reading E 90° N



1845

90

an horizon a little above the middle of the formation. The basal beds are calcareous and the top of the Grand Tower is a white marble. Of the marble ~~at the top~~ of the D.T. there is 15-20'. Between this & the Beauvais there are 15-20' of calcareous sandstone.

Σ 25



Correct compass  
reading set at  
time E 9 1/2 N

August 1

1846

2 1/2  
55 1/2  
1 1/2  
7 1/2  
20  
101

Section over hill S 70° E

30 91

Miss Z-20'

foss 2'  
covered  
foss 11'

10-13'  
sandstone

9' chert slope

Main edge

limestone and sandy limestone

55'

lithographic limestone

no fossils

A. calcareo arenaceous conglomerate 2'

B - 5 1/2, 11 1/2 light gray thin bedded sandy ls.

16 1/2 thin to heavy bedded buff sandy ls, 22, 27 1/2, 33.

consists of lithographic and sandy limestone. Strike N 70 E, 14 1/4° SW.

33-55' same.

55'-88' - covered except for small patch of chert on summit

On the slope of the hill facing due south and about 20' below the summit is a ledge of massive, hard buff limestone containing Hamilton fossils Large *Atrypa*, *C. flabellus*, *Sp. mucronatus*, *Cyrtina*, *L. papyriformis*, and *S. concava*

5 1/2' below the top of this ledge is another containing fossils.

A It is also hard, buff and contains *Rhipidomella*, *Athyra*, *Pterinea flabellum* and *Cyrtina*. The actual ledge is about 1' thick

Conglomerate 2'

15' sandy platy ls.  
Grand Tower





92

Below this bed comes an interval of 13' mostly covered but showing sandstone blocks in the talus. At 13' below this second ledge chert (sandy light brownish gray) appears in the talus. This is not true chert but appears to be a sandstone. Here were seen *Tropidoleptus*, *P. flabellum*, *Actinoptera*, *Strophodontia*, *Proetus*, etc. 9 feet below first block of chert is main scarp edge of this formation.

~~At the 10-13' interval of ss blocks and~~

Above the uppermost ledge of limestone plates and blocks of limestone with fossils were seen loose in the dirt. These blocks contain *C. scitulus* and *S. mucronatus*.



93

Section on St. Laurent  
Creek. 1848

Note on Compass readings, all  
taken with declination at 9° to east.  
correct here and all preceding stations

A. 2' heavy-bedded, lumpy, fine-grained sandstone without fossils. Light gray. N 80 W 66° N. To this may be added 25' on bottom.

B. - Single massive, quartzitic bed, fine grained 7' 3". base unconformable with A.

C. 12' fine grained sandstone, light yellow or pinkish gray, ~~being~~ breaking into thick lumps. Sp. Sifer about at three feet above base

D. 5 1/2' of sugary sandstone in a single massive ledge. Dip here is nearly vertical. Hard, coarse grained, brownish gray

E. 41" covered.

F. 30" coarse light gray quartzite

G. 7 1/2' covered

H. 8' - quartzite, soft coarse, limonitic at base, hard gray brown, dense, massive at top.

I. 18' covered.



See next Page ~~forward~~

1849

94

10' ss <i>Tropidoleptus</i>	Q	
16'	P	J. 2 1/2' coarse calcareous sandstone with fossils, <i>Chonetes</i> , <i>Atrypa</i> , coral
12'	O	K - hard massive blue gray calcareous sandstone 12'
7 1/2'	N	L - hard sandy limestone with beds abounding in fossils. At base are <i>Schizophoria</i> , <i>Atrypa</i> , <i>Chonetes coronatus</i> ?, <i>Proetus</i> . About 4' above base <i>S. audaculus</i> is abundant. Above this <i>S. mucronatus</i> is common. Fish
13'	M	
12'	L	
Many fossils		
12'	K	M - 13' feet of sandy limestone massive, dark bluish
1 1/2'	J	
18'	I	N - 7 1/2 feet thin-bedded, platy sandy limestone abounding in <i>C. coronatus</i> , <i>S. mucronatus</i> , <i>Camerozoechia</i> .
8'	H	
7 1/2'	G	
30" over 4 1/2"	F	
5 1/2'	D	O. - 12' sandy limestone passing into calcareous ss. with small <i>Chonetes</i> , <i>C. flabellus</i> and <i>Camerozoechia</i>
17'	C	
7' 3"	B	P. 16' of dark brown gray to blue arenaceous limestone
+ 25'	A	

34.5

38

16

13

2

38

20.5

25.5

33.5

11.5

12.

7.

---

251.5

---



95

in massive layers (3). At base *Leiorhynchus*, in middle and top *Orthis* is common.

Q. 10' - pinkish-white <sup>to gray</sup> fine-grained ss. having the texture of table salt. In lowest part of edge occurs *C. mucronatus*, *S. mucronatus*, *C. flabellus*, ~~and~~ little above the middle *Leptodoleptus* was found. This is the first it was seen in the section.

Total section  
25 1/2'

34 1/2'

R - 2' bed of hard ~~chert~~ quartzite containing a half or more of brown chert. *C. mucronatus*, *Leptostrophia*, *Pholidops*.

V S - 13' covered except for upper foot.

38'  
covered

T - 16' gray sandy limestone, ~~mostly~~ containing brown chert (chert here and in R is brown on weathered surface, gray or black within). Abounds in *C. mucronatus*, also *P. rara*, *rara*.

16'

T U - 38' covered.

13'

2' chert bed

Q

S

R

V. - 34 1/2' of hard, heavy bedded ~~smooth~~ blue brown



1851

96

gray limestone with many fossils in thin bands. Scattered *Camarotoechia*, *Sp. mucronatus*, *Proetus*, *Greenops*, *Cyrtina*, *Athyris*, here the beds strike N83°W and dip 77°N. Basal bed of this interval contains small *Cystiphyllum*. The *Camarotoechia* follows about 7' above the base. *C. coronatus* is common 10½' above base. The *Athyris* is in another layer with *Cystiphyllum* about 20' above base. *Cyrtina* is common here also. Above this *Sp. mucronatus* is most common.

At base of section A may be taken as 25' because a patch of it is present below (upstream) from the outcrop. This patch has a different dip and strike but is lithologically the same as the beds below the heavy ss. B.



(99)

August 4.

1852

## Bellamy Springs.

Get Mr. Greer Vincentown  
Chesapeake Bay. Foreign  
washings for Bryozoa & forams  
also R.S.P.

Aug 6

The lower 3-5 feet of Callaway  
are a veritable coral reef the rock  
abounds in corals, Acervularia, &  
cup corals. At the top of 3-4 they  
become less abundant and  
brachiopods come in. The lower  
limestone is light gray. The  
upper beds (2') weather to a  
brown color but are blue gray  
in color. The upper layers are  
crowded with *Atrypa missouriensis*  
and occasional *Cyrtina missouriensis*  
and *Sp. annae*. Of the *Atrypa* beds  
there appear to be about 2-3'

Above *Atrypa* the rock is  
smoother in texture, lighter  
gray and contains many  
*Stromatopora* and *Bryozoa*? At  
about 2 1/5' above the base the  
rock contains algae and  
a small *Athyrid*. There are  
about 25' of Callaway in all,  
the upper 15 at least composed  
of the algal ls. The top of  
the little hill is covered by ss.

Bryozoa  
and  
Algal  
ls. 15'

E  
2-3' *Atrypa*  
D

3' + coal  
C

6-8'  
sugary  
B ss.

A 5' coral  
ls.

Ord. blue  
sh + ls.



Aug. 6

(98)

Section in RR cut 1 1/2 miles  
S of Holt summit

A - 3' hard calcareous ss.

B. + 1-2' hard massive, sandy  
pinkish gray ls.

C. Mostly unfossiliferous smooth,  
light gray massive ls. 5' Fossils  
occur at top, Crinacea (large)

At top is a shale parting 8 ft - 1 1/2  
inches, ~~with~~

D - dark gray, granular, ls. with  
many fossils Strophodonta,  
Eosyringothyrus, Cyrtina, etc. The  
bed is divided into 2 parts by

E. a shale parting of 1-2" in  
the middle.

1'

D

5'

C

E. - is 3' of massive dark  
gray to brownish gray ls.

1-2'

B

abounding in Syringothyrus,

3'

A

big. Salysiphonia, Alcyon etc.

Ord

F - The smooth gray ls.  
with algae appears with  
of the above exposures in  
another cut



Ann Repts Bur. of  
Geology for 1854. 99

# Mouth of Cow Creek

1854

A. - Jeff City

B. - finely granular gray ls.  
few fossils 7'

C. 2'2" - gray granular  
limestone abounding in fine-  
lined *Atrypa* like *missouriensis*

27 1/2'

D

D. 27 1/2' - Callaway

2'2"

C

5 1/2' 7'

B.

A

B. - upper 2' of B is in  
hard gray brown ls. with  
many *Astiphyllum*. Base  
of B is very sandy.

Jeff City

B = *mineola*

1855

Cow Creek, S. of Yucatan.

100

At creek level occurs the Pelecypod zone of the Snyder Creek some 8' thick or more. This is overlain by  $\frac{1}{2}$  foot or 1' of limestone packed with *Schizophoria*. This is followed by blue-gray shaly limestone abounding in *Spirifer*. Above *Spirifer* there are two or more feet of shaly limestone with few fossils. This is overlain by a three to four foot ledge of hard limestone abounding in *Strophodont*. Then follows Kinderhook ss. and Burlington ls.

To reach this locality take Hy 40 nearly to Williamsburg then go south on county road D to Yucatan and from Yucatan to the creek.

Raymond E. Peck  
Asst. Trustee U. of Missouri

Went to write to J. D. Davies, U. of Missouri for Pennsylvanian *Fusulina* of Boone & Randolph Cos. from Cherokee & Henrietta.



101

Section of Cooper ls in a quarry about 20-21 miles South of Columbia, Mo.

A - 3' massive pinkish to brownish gray limestone thin-bedded & cherty in upper 6". Here fish fragments were seen.

B - 13 1/2' - light gray lithographic limestone weathering to a blue gray, in heavy bedded layers.

C - 1' same abounding in snails.

D - 3 1/2' of fine grained, light granular limestone abounding in two species of Favosites, Stromatopora, Atrypa, Pentamerella. Large snail.

E - 2' light gray ls. with dark, broken Stromatopora.

F - 14 1/2' smooth gray limestone in massive layers. No fossils seen.

G - 1/2' - white clay shale with nodular Favosites and Bryozoa.

H - fine grained light gray limestone, thin-bedded and

St. Peter

102

much fractured

1857

H - 11' fractured smooth gray limestone with calcite particles scattered in the mass.

I - 2' - rubble, crumbly light gray ls.

J. - a ledge of gray <sup>finely</sup> granular limestone weathering dark gray possibly Callaway. 1' +

Filling a crack in F, G, and H was seen green shale suggesting Snyder Creek.



47

Aug 15.

1863

108

Visited Minicola limestone about one mile south of Russelton following directions of J. S. Williams. Took rd down (south) center of sec 3 to junction with rd along north line section 10. Follow stream gully SE about  $\frac{1}{2}$  -  $\frac{3}{4}$  miles to exposure. Lowest rock is rather smooth dove, ash weathering limestone, baccinated in places. It strongly suggests the Cooper but is placed at the base of the Minicola. This is succeeded by some 8-10' of fossiliferous limestone abounding in broken corals and other fossils.

Prismatophyllum

Camarotoechia

Spirites

Spirites (4 sp)

Bryozoa

Cylindrops

Pentamerella

Spirifer

Camarotoechia

Cyrtina

The rock here suggests the reef limestone as at Alpena and elsewhere. Saw not no obvious Cedar Valley resemblances.

103

Exposure on Irish Hollow  
behind M.E. Church, Hamburg cell.

A -  $16\frac{1}{2}'$  hard massive limestone  
light gray, fine, smooth to crystalline.  
In uppermost bed many Cephalopods  
Murchisonia, Cheloniceras, Eospirifer, etc.  
appears to be Silurian.

Hamburg

B.  $1'$  - sugary to lumpy hard,  
fine grained ss. with *Atrypa*,  
*Strophodontas*, corals, at top *Atrypas*  
of *Leptina* type.

Blue Pk

~~Leptina~~  
Louisiana

10" - 1'

C -  $2\frac{1}{2}'$  of fine grained  
sandstone breaking into  
irregular plates, like the  
fine-grained sandstones in  
New York. Contains *Atrypas*  
of *Leptina* type, *Spirifer* like  
*indensis*, *Elizaphoria* and  
*Strophodontas*.

 $2\frac{1}{2}'$ 

10" - 1'

B.

 $16\frac{1}{2}'$ 

A

D - Hard massive layer  
about 6" thick containing  
many worm-borings on  
the upper surface. This  
is overlain by about 10" of  
greenish shale.

B - D is Devonian.



1859

104

The rock <sup>of C+D</sup> is apparently strongly <sup>not a ss</sup> lumpy and in places is yellow like the Cedar Valley.

# Section in Salt Spring Hollow

A - 1-2' of hard blue, yellow gray or buff ls. without fossils.

B - 13' minus - shaly weathering light gray limestone abounding in white chert. Fossils common *Sp. iowensis*, *Sclerophoria*, *Leptostrophia*, *Pentamerella*, *Strophodontas*, corals, *Schuchertella*, *Atrypa* *lystus* type. The upper 3-5' are largely covered.

C - of heavy bedded massive light gray granular to crinoidal limestone with *Atrypa*, *Pholidostrophia*, *Cyrtina*, *Strophodontas* and corals.

D - 1 1/2' of coarse sugary, hard sandstone weathering dark brown, and abounding in fossils. Upper surface with large *Trochus*.

Loess

1 1/2'

9'

13'

1-2'

10' ±

Silurian



105

In the lower part of C.  
a *Schizophoria* is common.  
About 4-5' *Cyrtina* is  
abundant and at the very  
top a small *Atrypa* is common.

Exposures along a little  
creek in ~~SE 1/4 NE 1/4 20-18-2W.~~  
SW cor. SE 1/4 NE 1/4 20-18-2W.  
In the lowest 5' of the  
exposed Devonian were seen  
numerous *Cranidia*, *Brontes*,  
*Douvillina*, *Pholidostrophia*, *Proetus*,  
clams, etc. The fauna suggests  
the beds at Solon or perhaps  
Corbottle. These beds underlie  
the limestones with *Spirifer*  
and *Schizophoria* which may  
be seen farther upstream <sup>and</sup>  
a little west of the spring.  
The rock carrying the *Trematolites*  
and *Brontes* is a shelly ls.  
often in thick plates and  
very hard.



1861

106

Aug. 14.

Beds carrying *Bronteus* and associated forms are about 8' feet thick and unclayey yellowish sandy platy limestone with *Spirifer*, *Schizophoria*, *Leptostrophia*, *Schuchertella*, *Strophodontia*, *Pholidostrophia*. The same beds that form the basal part of the Salt Spring hollow section. In the upper part of the creek below Katesville *Prismatophyllum* was present. It was also seen where we found the *Bronteus* but not in place.

The exposures are in the bed of the creek slightly west of the first house. The rock is hard platy limestone.



1862

Section 3 miles west  
of Fieldon, Illinois

As suggested  
lithology.

A - Smooth massive  
dove colored limestone without fossils,  
possibly Silurian, possibly  
same as at base of  
section in Salt Spring  
Hollow. Contains small crystals  
of calcite.

B - About 22' of limestone  
shaly in the lower part  
but upper 8-10' massive  
with corals and crinoid  
fragments. In the upper  
part *Pholidostrophia* is  
very abundant.

In lower part the  
rock is rather shaly  
and abounds in  
sp. of the *ovensis* type

1-2 1/2' C.

22' B

5' A C. - About 1' - 2 1/2' of rather coarse  
sand abounding in fossils  
particularly *Atrypa* and  
*Cyrtina*.

AA

AA - Dove colored limestones  
generally granular irregularly  
bedded lg.

Ove



contact of Cooper? and Cedar  
Valley is about 1 or 2 rds  
upstream from ford.

1864

109

Independence shale 2 miles  
5 and 1 1/2 miles due west of Brandon  
Iowa, Cedar River section described  
by Savage in the Benton Co. report.

Cedar Valley exposed as a bluff  
along the Cedar River. Independence  
shale occupies <sup>half</sup> a funnel shaped  
depression. The sides of the Cedar  
Valley bounding the shale are  
rather sharp. ~~Rock ~~is~~ ~~at~~ ~~the~~ ~~base~~ ~~of~~ ~~the~~ ~~but~~ ~~crop~~ ~~and~~ ~~low~~ ~~on~~ ~~the~~ ~~side~~ ~~of~~ ~~the~~ ~~river~~ ~~is~~ ~~filled~~ ~~or~~ ~~broken~~ ~~up~~ ~~by~~ ~~possible~~ ~~slumped~~ ~~blocks~~ ~~occupy~~ ~~a~~ ~~portion~~ ~~of~~ ~~the~~ ~~interior~~ ~~of~~ ~~the~~ ~~funnel~~ ~~The~~ ~~funnel~~ ~~is~~ ~~not~~ ~~complete~~ ~~as~~ ~~part~~ ~~of~~ ~~the~~ ~~section~~ ~~is~~ ~~covered~~~~  
at the base ~~side~~ of the butcrop and <sup>low</sup> on the side  
River is filled or broken. Possible  
slumped blocks occupy a portion of  
the interior of the funnel. The  
funnel is not complete as  
part of the section is covered





Shellsburg, Well 1865

110

Went down 55' before samples were taken.

- 55-60 - Gyroceras beds (basal Linwood)  
60-65 - Independence sh, calcilutite fragments  
65-70 - <sup>blue</sup> shale with pyrite (Independence)  
70-75 - blue sh. with Tentaculites (Ind.).  
75-80 - blue shale  
80-85 - shaly but mostly calcilutite  
85-90 - mostly earthy ls.  
90-95 - harder ls.  
95-100 - " "  
100-105 - shaly material  
105-110 - shaly - earthy limestone (Crinoid)  
110-115 - calcilutite (fossils)  
115-120 - Lithographic ls. Otis  
120-125 - " "  
125-130 - " "  
130-135 - " "  
135-140 - " " fossils (Coggan)

70-75 - Crinoid segment, Tentaculites, unrecognizable fragments

135-140 - D. variabilis, D. arcuata

115-120 - D. variabilis.

150-155 - Stroph. reversa.

D. arcuata found 70' below limestone at Walker.

1866

111

Independence - mid sec, 25,  
Washington Tm. Linn Co at  
bridge over Otter Creek

Here Stairwork would  
have faults to account for  
position of Independence

~~Stairwork~~

Lower Linnwood

Independence

Buccia  
without  
fossils

Upper  
Linnwood  
A. independence



112

Pine Creek  
near Anasquan.

1867

Independence shale occupies  
a depression about 100 yds upstream  
and rests against a block of  
Newberia zone tilted upstream.  
And the Newberia block rests against  
undisturbed Independence zone.  
Large tilted blocks occur on W side  
of stream.

Aug 20.

Cedar Valley 2.2 miles NW  
of Spring Valley on Hy US 63.

A - Heavy massive ledge of  
buff dolomite 3' thick

Trochomena

Cyrtina

Spinifer

Atrypa etc.

B

Proetus

B - Buff porous dolomite  
A crumbling to small fragments  
the size of a cobble. Contains  
an Atrypa like A. independence.

113

Near Hamilton, Minnesota  
 A Under the bridge over Bear  
 Creek a short distance S of  
 Hamilton there is Ordovician  
 dolomitic limestone and shale  
 about 10 or 15'.

Under bridge over the same  
 Creek on Hy U.S. 63, a short  
 distance S of Racine is exposed  
 considerable Devonian.

B<sub>1</sub> - Covered

5' +

C - about 13', mostly covered  
 F but showing thin bedded, fine  
 grained, cream - to yellow dolomite?  
 but no fossils were seen.

9-10'

D - 1 1/2 - 2' thick bedded yellow  
 E dolomite with few fossils

13'

D E - 9-10' of heavy massive  
 C ledges of dolomite with many  
 fossils

Covered  
11'

B. F - 5' + - crumbly buff to  
 yellow dolomite with many  
 fossils

Ord

A

About 1/2 mile S of bridge  
 on W side road about 5' of  
 platy brittle, dove colored ls.  
 but no fossils were seen  
 except a crinoid column.



114

Fowler & Pay Co.

1869

A- 7-8' lithographic, white ls. in thick layers often separated by thin seams of green clay!

B- 10" white ls. with many fossils mostly small strophomena.

C. 1 1/2' gray lithographic ls.

05/10

E

D

C

B

A

D- broken ls mixed with brown loam

E- platy, thin-bedded white ls. suggesting fresh-water deposit

Sink in Qy.

No slumping on sides of sink

Limestone

Sandy clay

limestone Qy

1870

115

Laramie Ry.  
Spring Valley, Minn.

A. Two ledges heavy yellow dolomite  
very fossiliferous aggregating  
10'

B - about 6' rubble yellow  
dolomite, much pitted.  
A. lenticular seen.

6'

B

The beds of Devonian  
around Laramie suggest  
the same lithology as  
at the top of the  
Laramie in the  
central part of Michigan.  
It suggests a shoaling  
of waters with decreasing  
salinity.

10'

A



146

Aug 21.

1871

To reach West Bend Hill  
take Floyd + Cerro Gordo  
Co. Hy D. to the outcrop,  
just 5 miles.

Aug. 25

Coralline Sec 15 Buffalo Twp.  
about 1 mile N. of Buffalo.

A - 4-5' massive "fucoidal"  
sandy blue ls weathering to  
yellow.

B - 10'  $\pm$  leached sandy  
C. limestone now gray to yellow  
with many sheets of  
Stromatopora. Thin and lamellar  
When turned over show strong  
concentric rings. In this  
part. Athyris, Ananina,  
Cameropteria occur with a  
few corals, Zaphrentis, coral  
like Cladopora. At top is  
a one foot layer with  
large Strophodontia  
large Sclerophoria, cup corals

C. Brown rotted dolomite ls.

This section strongly suggests the  
upper Callaway with its sheets of lamellar Strom.

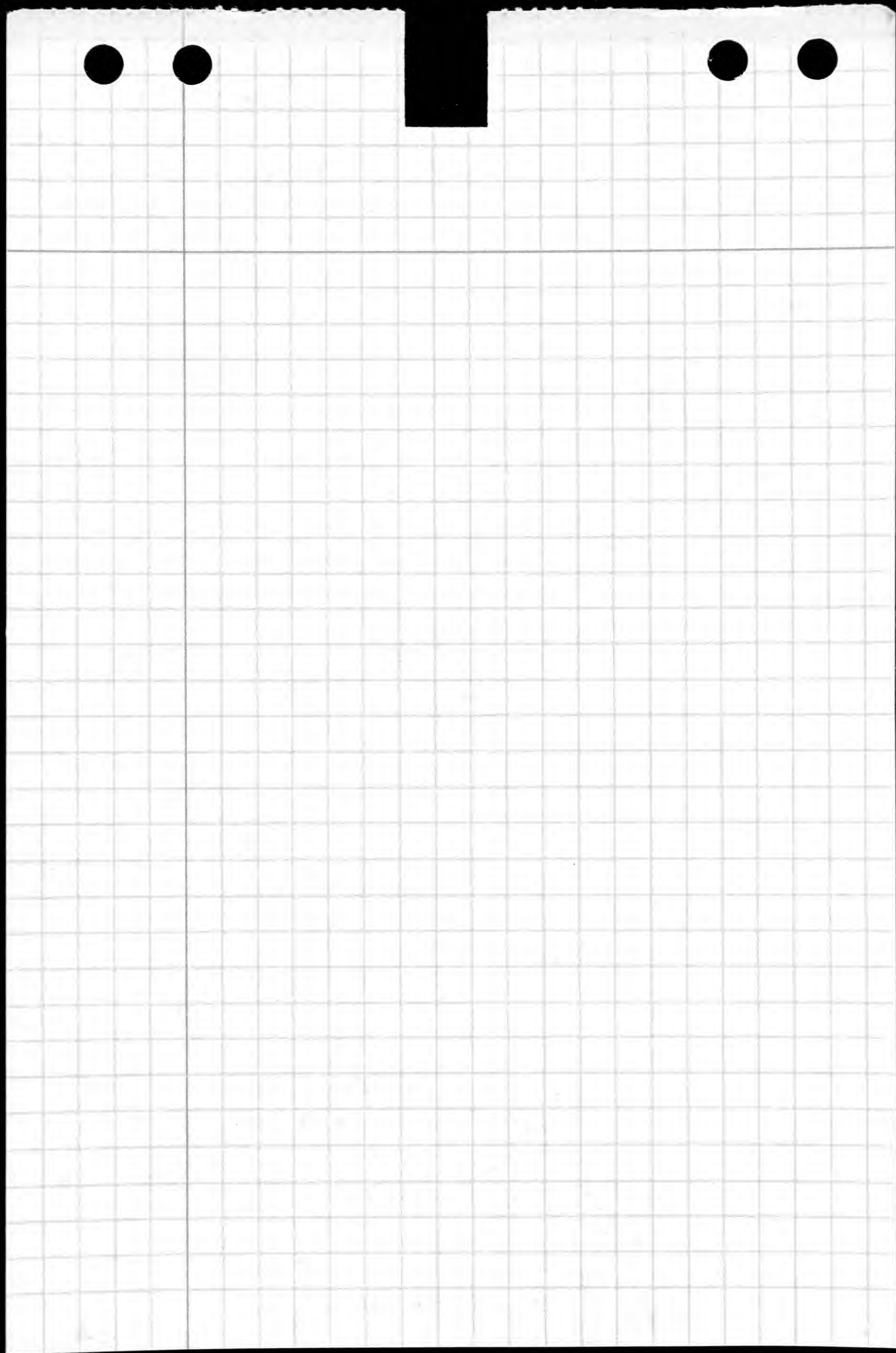
1872

147

Notes on lower Missourian - alluvial

The Missourian section appears to be well represented in the Cadron Valley. The Minola may represent the Davidson zone near the top of the Littleton and this would make the Callaway Corralville. The lower Callaway is equal to the Waterlooensis zone and the upper Callaway equal to the Cranaena zone. In Calhoun Co. the Brontons zone equals the Waterlooensis zone and the rest of the section equals the Cranaena zone.





158

August 28.

1873

Beds with *Gypidula*  
*petoskeyensis* at base of  
Pohl's bed. 21 appear at  
intersection of Encampment  
ave. and U.S. 31. about 100  
yds. NE of the Penna. R.R.  
Station at Bayview.

Ask Ehlers to send me  
section and specimens.

Ask Dr. Ehlers for correspond-  
ence or information on  
nomenclature of Gravel Pt.

Aug. 29.

Get print of section on shore  
at Bayview showing Pohl's  
bed b. cl. in possession of Dr.  
A.W. Slocum.

~~The genus of~~ Send Ehlers  
one or two Strobilomastites.  
Look for dorsal valves of  
Leptalexia in 14 c, if none  
are found write to Slocum  
for some.



189

Shore at Ant's Bay

1874



Cinnabara bed of basal Petoskey lies in a syncline leveled by topography. It is a low anticline of Peleopod bed and superjacent layers but not cinnabara, which has been eroded off.

Cinnabara bed seems to me to be a lens thinning eastward from where it first walls off, and is thickest at the SW corner and NW going west from Bay.

1875

Aug 30, 1936

120

Charles Lake is mostly shallow  
water & possibly blackish  
water

Section  $1\frac{1}{4}$  miles N of Norwood  
On a new road  $1\frac{1}{4}$  mi. N of  
Norwood is a new exposure of  
black shales 14' feet above the  
lake and on the roadside.  
About 13' feet below the  
black shale are two layers  
of gray shaly ls. The upper  
layer is crowded with  
Schizophoria and Actinoptera.  
Below this is a layer with  
large Pentamerella and  
Trilobites. These beds aggregate  
about 15" (guess) and overlie  
the dolomite layers we called  
the top of the section. There  
must still be a gap between  
the black shale and the  
Traverse.

The Traverse rocks have  
a dip of to the SW as high  
as  $10^\circ$ . The black shale  
is about horizontal. The  
difference in dip between the  
two suggest an angular  
unconformity.



1876

121

Chlers has *Stylolina* above  
Square Bay at old mill  
N of Payton Ave. makes  
Square Bay & Dundas

Send Mrs. D. reprints

Aug 31

Shore at Bayview

Beds with anhydrite come  
about 1' or less under upper  
blue shale (Bed bed 6). The  
~~beds from~~ fossils from  
the gravel are from the  
contact of the upper  
blue and limestone with  
anhydrite xls. Must overhaul  
my specimens at Washington

The beds with anhydrite  
contain many fossils.

*Conradina* a, *Cameropteria*  
(small resembling gamet),

*Pentamerella* large, snails,  
*Trichonema*, etc.

Dundas  
bed

Bed 6

Is with  
anhydrite





122

Loc 21a

Aug 31

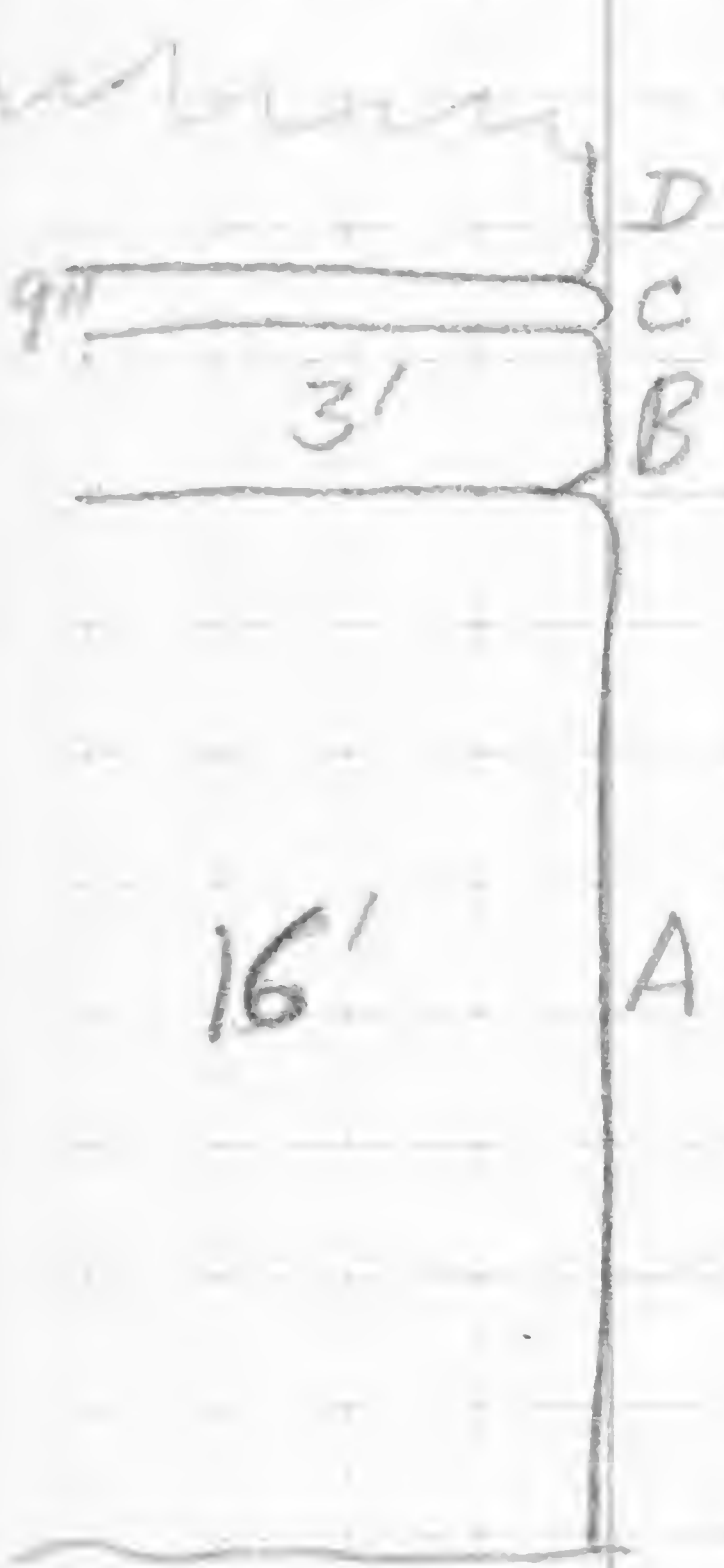
1877

Section at Junction of Hys. 31 + 131.

A - brown porous ls. become lighter & denser at top.

B. S. petoskeyensis bed, probably same as at base of "Pohl's bl" which is the "Mud Lake Qy". Blue shale, fossils loose.  
C. Limestone about 9"

D - Blue shale with many *Cyrtina alperensis* and *S. petoskeyensis*



152  
26  
169

206  
21  
169



1878

123

Sept. 1  
all day at 4-mile dam.

Sept. 2.

Elevation on Killians Terrace  
(A57) about  $5\frac{1}{4}$  miles N of  
Alpena on Long Lake Road.  
680'

Upper Genshaw on Long Lake Rd  
706'.

Top of lowest ls of Genshaw on  
French road is 733'

Top of Killians on French Rd 772'

Elevation at ~~section line~~ road  
corner at 4 Mile dam is 645'  
This is about the top of the  
lower crinoidal ls. of the  
Potter Farm.

4-mile dam reef is 615'

Elevation on ~~Killians~~ Reuben  
farm exposure of Genshaw is  
710'

Wesol Rd Killians 675'

1879

124

Limestones on 7 Mile dam  
just below the ss. contain  
*C. coronatus*, *Sp. pennatus*,  
*Camartoechia* and *Pholad-*  
*strophis*. Presence of  
*C. coronatus* suggests a possible  
link with the Norway Point

Sept 3

Thunder Bay Bay

A - Alpena

B - Dock Street

Soil

C. - 20-30" gray granular, fine  
grained ls. containing  
*Dinorthis*, *S. divaricatus*,  
*Reticularia*, *Camartoechia* etc.

20-30"

D. - 5'-6' variable ls, brown,  
crinoidal, many corals and  
platy stromatopora. Bryozoa,  
*Camartospira*, etc. On loose  
pieces of sand what I thought  
to be *C. coronatus*. Top is  
nodular and sandy.  
Stromatopora is abundant in  
the top layers.



125

Chlorine has Bronteus from  
W. Virginia 1880

Sept. 4, 1936

Rockport Cy

F-389

E-27" yellow-weathering

brownish earthy ls. probably blue  
gray when fresh

D

containing shale pebbles, cup

C

corals overlain by blue shale  
(bed A). Bed E contains large

B

Prismatophyllum, large Atrypa  
but not as large as that in  
the Genesee.

A

D- About 10" blue shale with  
Prismatophyllum and cup coralsC- 27" of hard blue gray  
brown to yellow-weathering ls.  
containing many Prismato-  
phyllum, Favosites and large  
Atrypa.B- 2" blue shale containing  
Cyrtina, sp. mucronatus like  
that of the Ferron Pt., a small  
Comarostoechia C, and many  
Fenestella in upper part

Soil 6"

G

Blue sh 34"

F-389

27"

E

10"

D

27"

C

26"

B

20"

A

Ferron  
Point

Rockport



1881

126

A - 20" - consists of 2 beds of ~~bluish~~ dark gray earthy limestone separated by 3" of shaly ls. The lower bed is 10" thick and the upper one 7" contains large *Atrypa*, huge *Prismatophyllum*.

bed F - blue shale abounding in bryozoa, suggests bottom of A.P.C. Cy.

bed G. 6" of limestone at top of section.

B - lower part bed B seems to have many of regular Ferron Pt. types such as large *Spinifer*, *Atrypa* etc. Preston took 3 *Schistotheca* from this bed.

Ledge of Rockport is 640, from 620

Ledge of Henshaw on road to Rockport is recorded at 670. Barometer at Long Lake read 660

Ferron Point fossils go as high as top of E.



127

Sept. 4

1882

an exposure of basal Alpena  
just above the Killians was  
found *Chonetes coronatus*

Sept. 5.

Abandoned shale pit Alpena  
Portland Cement Co.

Sent Dr. Ehlers small  
*Pleurodictyons* from Bell sh.

Important

Look up ownership of 1926  
collections.

Ask for Permian of Sicily

" " Tasmanian specimens

" " *Schizorammina* (*Dolothia austria*)

" " *Meristospira* (Topotypes).

158

Gerd. Ehlers Archaeocyathus  
Homalonotus (Dipleura) 1883

D. M. Ehlers, 1609 S. University Ave., A.A.

## Deep Run

Heavier  
beds  
30' ±

A - granular, brown-gray, fossiliferous ls. with *Nucleocyathus vermiculi* at top.

8-10'

D

B - 6' ls. brownish gray massive with many sp. like *Lucasi* and large *Leptaena*, *Schizophoria*  
~~*Leptaena* - *Lucasi*~~ ?

C, 4' ± brown, fine-grained hard ls.

4' ±

C

D - shaly ls + sh with *Martini*, *Leiorhynchus* etc.

Del.

*S. acuminatus*  
6'

on

B

Onon.  
Columbus

A

2

River level



Michigan  
1937

257  
10  
8  
12  
114

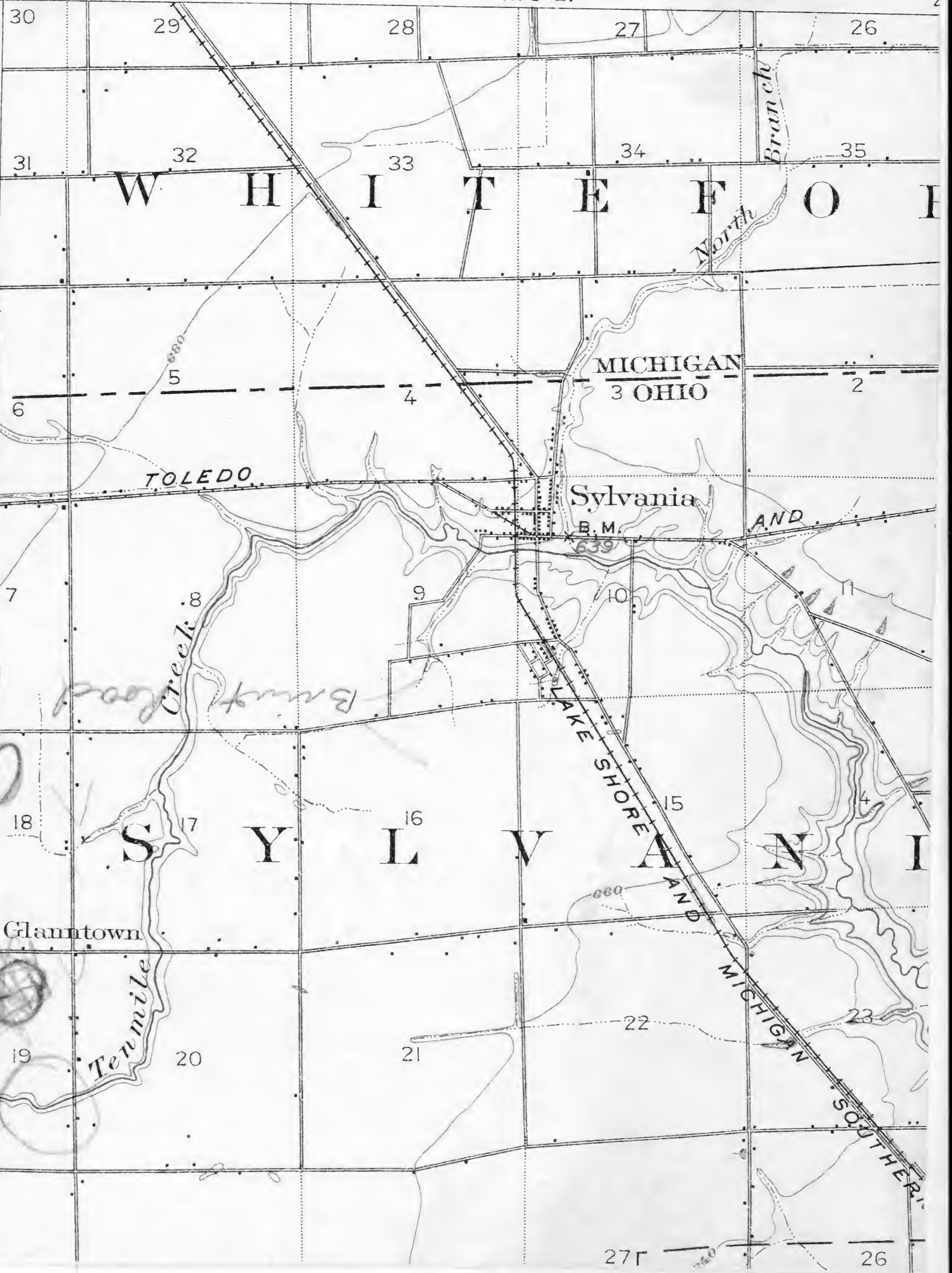
9666  
940  
2590  
2.7  
370

920  
736  
1840  
2.5  
368

83° 45'  
41° 45'

R. 6 E.

T. 8 S.



27

26



①

June 3

1884

10-mile Creek

Silica shale with sp. brownochia in both banks at 200-245. Shaly ls band with small crinoids, sp. musonatus and Rhipidomella at 245. This is the Rhipidomella bed of the Upper Silica 244-245 - nothing

245-505 blue shale with Camerobius sp. pinnatus (sparsely fossiliferous)

~~505-535~~ blocks with Liorhynchus

~~543-535~~ 535-570 grey shaly ls with small Strophodonta, Rhidatropia Schizophoria

At 570 shaly blocks mixed with dolomite with white chert + corals.

at 645 corals not present in dolomite. At about 700 hard blocky dolomite appears

At 757 these blocky dolomites appear in bank about 4-5' above floor of creek. Digging 4 1/2' Crinoid here.

757-928 The dolomite is exposed. At 928 comes a bridge over creek

at 976 the dolomite passes under bed of stream



(2)

~~Dip + strike here~~ 1885

Working downstream

Dolomite goes under stream  
57 paces above second  
bridge upper layer massive  
with much mineral. 60 paces  
downstream is following section

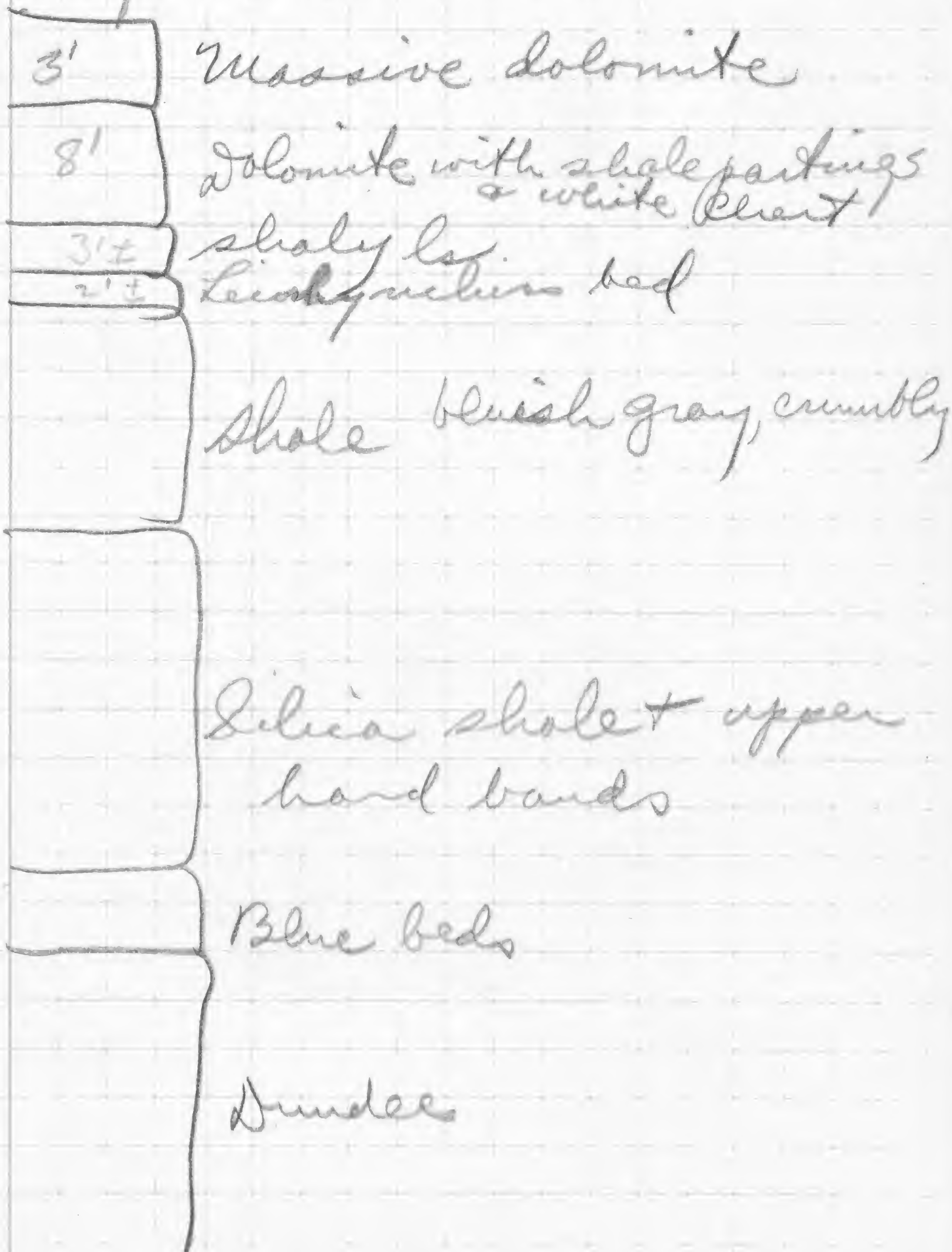
3' dolomite heavy bedded, <sup>light grey</sup> rusty &  
pyrite-bearing at top  
2-8' 2' <sup>dark grey</sup> irregularly bedded dolomite with  
shale partings & corals  
stream.

The outcrop disappears 130  
paces below bridge. The  
dolomite separated by sh  
is about 6-8' thick and I think  
belongs to coral beds just above  
the Leiorhynchus. Between 160  
and 240 there is much  
white druse in the dolomite.  
These may represent lower  
beds perhaps 3' making  
the total 10-11'. About 300  
appears shaly bedg with  
bryozoa Schizophoria, small  
Strophodonts, & Pholidostrophia  
353 Leiorhynchus bed.



(3)

The Ten-Mile Creek <sup>1886</sup>  
section sketched is  
as follows





4

June 5

1887

Collected at East end Pet. Port.  
Cement Co. Ay. Lower Blue.  
Collected Upper Blue at Bay  
View.

June 6

Charleston Rock prod. Co. Ay in  
morning, Bell Ay in afternoon

June 7

Collected big Atypa bed in  
morning.

Afternoon visited west side  
of Pet. Port. Cement Co. Ay.

Visited 14c or at Ding  
rate an abandoned Ay. |  
about  $\frac{1}{2}$  mile west of West  
end of P.P.C. Co. Ay and about  
 $\frac{1}{2}$  mile east of the Bell Ay.  
Geographically this locality  
fits Poll's loc. 14c but we  
could not check his section  
Measured from lowest well  
exposed there are 17' to a  
band of dark shale abounding  
in small *Strophodontas*.  
This is not the "lower blue  
shale" but a bed of dark  
shale about 3" thick. Above  
the shale there about 13' of



1888

5

rock exposed. The limestone is brittle, fine grained in the lower part. More massive above. The section appears to be all Gravel Point, and I think all below the "lower blueish".

Send Bloss Bradley Brook  
Pisomatozylus

This 14c quarry is exactly 2.74 miles <sup>E</sup> from the X-roads at Bayshore. And about 1/2 mile west of the abandoned Bell quarry.

To reach Bell Og, take Hy. 31 east from Bayshore 2.3 miles to a wood road leading north. Follow this road to Og.

6

June 8

1889

Section exposed along road  
N mile from black sh  
outcrop on road N of Hornwood

A - 17" pinkish, fine grained  
smooth, sublitrographitic ls.  
Upper surface very irregular  
Magnetic reading  $N 56^{\circ} W 90^{\circ} S$ .

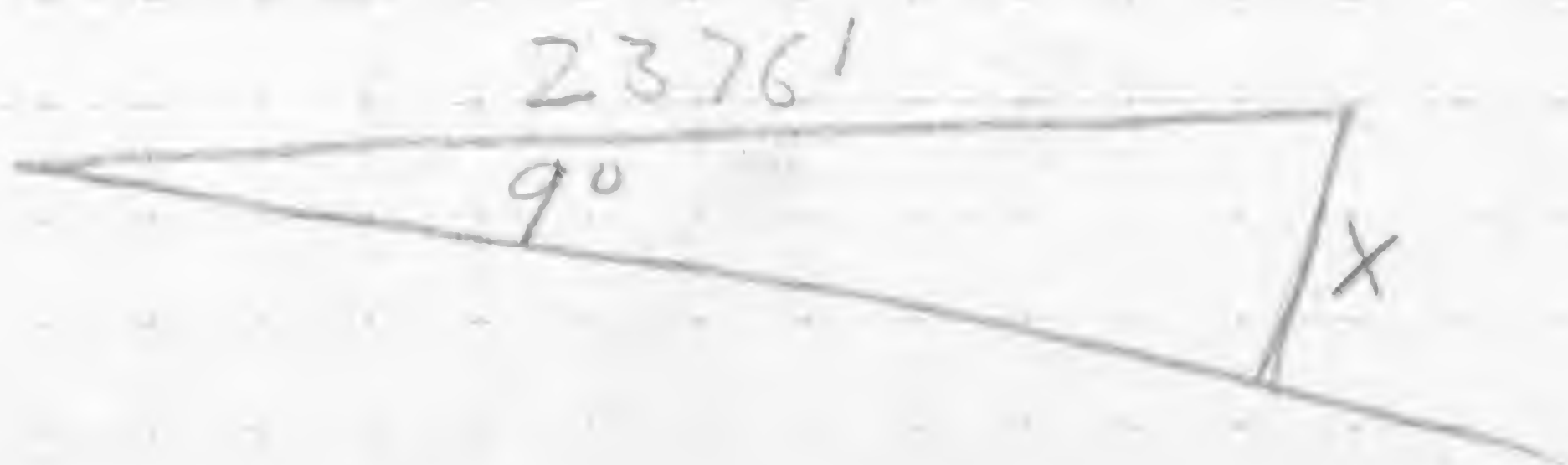
B. - blue sh same as  
under Pohl's *Atrypa* bed  
contains *Heteroschisma*. About 12'

C. Pohl's *Atrypa* zone  
About 2' exposed. *Atrypas* in  
shaly lower part, digitate  
fossils above



Thickness of  
blue sh

Thickness from blue sh to Black





First right hand turn in Nov.  
10.85 - turn to Norwood.  
9.5 - Black sh.  
9.05 - bluish.

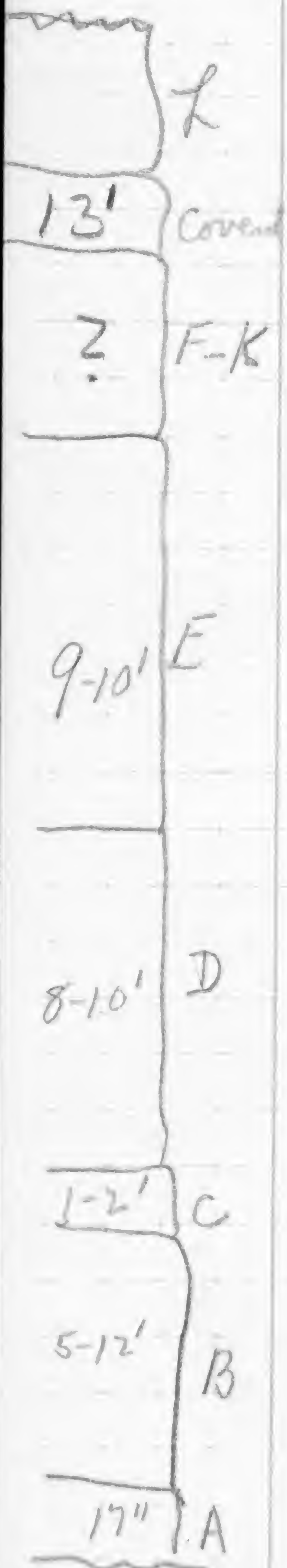
$$\begin{array}{r} 5280 \\ .45 \\ \hline 26400 \\ 21120 \\ \hline 2376.00 \end{array}$$

(7)

June 9

1890

Collected and studied section  
North of Newwood.



A - Smooth pinkish ls. 17"

B - Blue shale with *Heteroschisma*  
not less than 5' nor more  
than 12'.

C. *Atrypa* bed of Pohl. One to  
2'.

D - Thin platy limestone with  
layers of brown chert. Fossils  
few, mostly corals, worm  
trails. This bed is 8-10' thick.

E. Heavy-bedded dolomite  
with large snails, impressions  
of corals (*Cladopora*)? 9-10'+

F-K - 6 beds of shale  
covering an interval on the  
beach of about 22' (I would  
guess not more than 4 or  
5'. These beds contain  
*Schizophoria*, *Pugnoides*, etc.

Covered - About 10-13' above  
the *Schizophoria* bed.

37' - 48'



(8)

## Structure

1891

The black shale is exposed 1.1 miles from the turn <sup>near the shore</sup> at Hornwood. ~~There~~ are exposed 3-4' of black shale. For some distance along the road and on the slopes facing the beach large masses of bituminous limestone are common. When fresh they are hard, dark, fine grained and much rounded from solution. These contain a Naples (Squemo Bay) fauna. They probably are not a single bed but are hard beds in the shale.

The first exposure of Traverso rocks north of the black shale is on the road 1350' north of the black shale. This exposes the dolomite with *Cladopora* impressions and the section is intermittently exposed to the blue shale which is about 0.45 mile north of the black shale.

The blue shale is exposed on the shore not far ~~south of~~ southwest of its exposure in the road. It is exposed in a flat part of the beach opposite



1892

(9)

Strike on shore N of  
Howard N 50° W.

a bluff of the cherty beds. The top bed forms a low ledge in the beach dipping south and it can be followed to the lake where slightly higher beds can be seen dipping west and north west. This appears to be the center of a dome, its ~~highest~~ lowest exposed inner portion being the blue shale on the road. The succeeding beds can be followed south along the shore where their edges show on the beach and good sections in the bluff. The northernmost part of the bluff has a dip of 40° to the south. The upper dolomites are present in the beach near the black shale. Here they appear to flatten out, change strike to about NE and swing south to surround a small basin near the black shale. ~~These beds are~~

At the black shale the road descends to a depression but rises to the north up the dip of the Traverse. On the shore opposite (just W.) of the black shale the dolomite appears to bound a depression in which beds F-K are



1893

10

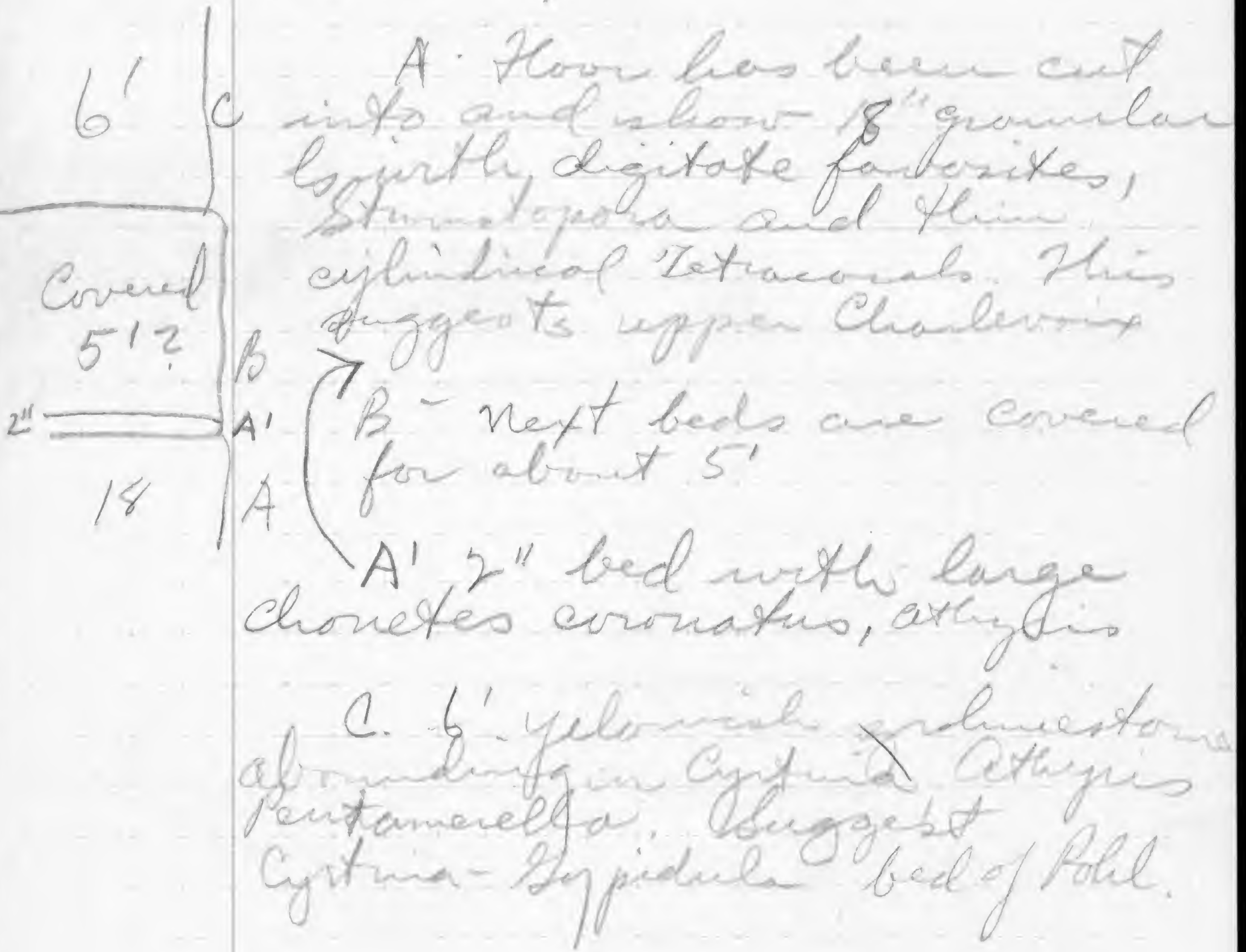
found. These beds strike  $N 30^{\circ} - 40^{\circ} W.$  and are only found in this small area.

The lowest bed of this sequence is a greenish hard limestone 2-4" thick. This is followed by shale? Bed 3 is a somewhat crinoidal ls. with *Leptaena* and *Leiorhynchus*. 5. contains many *Actinoptera* and *Schizophoria*. 6 is a shale? with *Pugnoides*. There are about 13' to the black shale. This 13' may be all or part black shale.

(11)

June 10 1894

Loc. 12 - R.A. Smith Test Bay  
Lower bed dips  $13^{\circ}$  S and strikes  
N 80 W (mag).





(12)

junction 131-31. 1895

About 5' of brown ls in ditch overlain by 2' yellow weathering blue shale with many *Pentamerella*. This is overlain by about 1' ls. All dips 3-4° toward

about 1/2 mi.  
76 - pit N of center of 76 in Norwood. Only rock in place is a cream colored smooth ls. containing crystalline spots and finger-like corals or *Stromatopora*. Dolomite pieces were seen loose. This is same kind of rock as that on shore just north of Norwood. Squaw Bay hard-heads were not seen.

Charlevoix rock Products Co. Co. should be located in SW 1/4 SE 1/4 sec 24, west of Charlevoix





(13)

1886

June 11.

Went to Bell Bay and  
came out on a line due  
S from extreme W end of Bay.  
We landed on the highway  
about 1000' (920'-999') west of the  
entrance to the quarry at  
the road. The <sup>W end of the</sup> quarry is thus  
due N of a point 2.1 miles East  
of Bay Shore corner.

June 12.

Mud Lake exposure is  
0.4 mile on Hwy 131 from  
junction with 31.

June 12'

A. Gray crumbly shale, teeming  
with a small smooth *Athyris*.  
Also small *Strophodonts* +  
large *Spurifer* 6"

3'

B

B. Gray blue ls. with *Pagurus* -  
*Phyllanthus*, sp. *meconatus*,  
large sp., large *Athyris*,  
*C. coronatus*.

6"

A

to NW corner A + NE cor 5, 34 N-6E  
at Orchard.



1897

June 13.

SW  $\frac{1}{4}$  SW  $\frac{1}{4}$  4 - 31 N - 8 E about  
2.2 mi. N of Poor Farm  
on French Road. granular  
ls. with sp. granulosus and  
Camarotoechia abundant.

at intersection of French and  
Turkey road

Collected also at APCG by Long Lake Rd.

June 14

Collected  $\frac{3}{4}$  mile downstream  
from 4-Mile Dam + at 4-Mile  
Dam.

About 10' below the section  
corner at 4-Mile Dam and  
in the field to east of the  
corner is a ditch in limestone,  
granular with *Cystina* a  
small *Athyris*, small *Pentamerella*  
The ls. forms a flat east  
of the section corner and  
underlies the level field  
through which the power  
line passes. This is  
undoubtedly one of the  
lower Potter Farm ls.  
About 3' of ls exposed

This is same  
as antelope at  
Norway Pt. Dam

(14)



02.45  
00.7

1898

June 18

About 1 1/2 mi NW of Bolton  
SE 1/4 SW 1/4 5, 32 N-7E.

Small Og with 2' of crinoidal ls.  
separated by 3" of shale from  
5' of crinoidal ls. A small sink  
about 100 yds N of the Og  
exposes some 10' feet more of  
rock. not collected.

J. 18<sup>1</sup>

0.55 from (NW) of French Rd &  
Truckee School intersection  
gray cherty ls. with Camarotoechia

J. 18<sup>2</sup>

Cherty ls. with Cystina.  
Camarotoechia, Strophodontia etc.  
This ls. is exposed from French-  
Truckee road intersection SE  
to Alberta City line where there  
are exposures on each side of  
the road, and behind Grove  
Farm.



16

June 18-19

1899

### Potter Farm

Cemetery pit shows two faunas  
a lower one characterized by  
large wide-hinged *Strophodonts*  
and an upper one with small  
fine-ribbed *Strophodonts*,  
*Canerophoria* and *Cranaea*. This  
upper fauna underlies a  
limestone bed possibly 1 foot  
thick. This is overlain by  
shale with large *Cranaea*  
and *Cyrtina alpehensis*. This  
is well shown in about the  
center of the pasture between  
the cemetery pit and the road.  
Here a ditch is cut through  
and shows in the center the  
beds with *Canerophoria* and  
small *Strophodonts*. Then follow  
a thin limestone and then  
the beds with large *Cranaea*  
and *Cyrtina alpehensis*. The  
latter bed is followed by  
the section along U.S. 23.  
I would guess the Cemetery  
pit would add some 10' to  
the Potter Farm section.

17

June 21

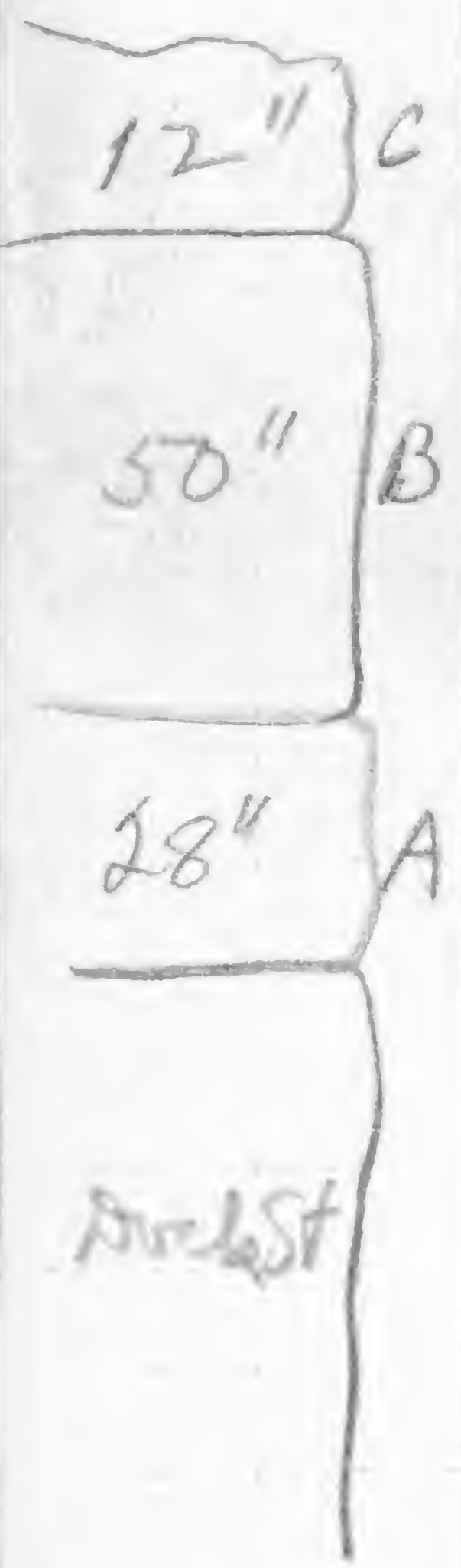
1900

Section above Dock St. Clay  
Thunder Bay Cy

A - 28" of hard, gray fine  
granular ls. with sp. venustas,  
Camarospira etc. These occur  
in the beds from 22" down.

B. 50" of granular gray ls.  
with dark brown thin shaly  
strakes and abounding in Grabs  
and plates of Stromatopora.

C. About 1 foot ~~yellow~~ gray  
nodular ls. with irregular  
layers of yellow sandy shale  
Stromatopora abundant, Atrypa,  
large Spirifer.



75



50

18a

June 22

1901

①

Genshaw about 2 mi E of  
Oquesoc Falls on U.S. 23.  
3-4' conoidal gray ls. irregularly  
bedded with black sandy  
partings. *Pentamerella*, big  
*Spinifer*, *Strophodont*

No. June 22

About 1 foot gray Genshaw  
with large *Pentamerella*, *Atrypa*  
In a dry water course to west  
of road are 5-10 feet of this rock  
Large *Pentamerella* is abundant.  
This is probably the same as the  
rock at Lower

6- June 22' Falls at Rainy River. - 10-15'  
of Genshaw in 2 anticlines  
one on each side of river.  
Fossils common

Big <i>Spinifer</i>	<i>Cyrtina</i>
2 big <i>Pentamerella</i>	<i>Atrypa</i> (with <i>Strom</i> )
<i>Pholidostrophia</i> (big)	<i>Strophodontas</i>
<i>Prochertella</i>	<i>Prismatophylax</i>

This exposure is essentially  
same as June 22, and I think  
both tie to the beds at Lower



1902

June 22<sup>nd</sup> - 1.45 miles from M 95  
 Gray ls. with sp. *micronatus*,  
*Stypan*, large sp. Black waxy  
 partings. Probably Rockport

### Black Lake

- A - Smooth gray ls.
- B - Gray shale
- C - 3" gray conoidal ls.
- D - 9-10' shale
- E - Cliff of massive gray, conoidal  
 ls. with large sp., *Prismatophylloids*  
 and large *Pentamerella* about  
 15-20' This is Genshaw

15-20'  
 Genshaw

9'-10'

3'

Rockport  
 upper 27'

The Genshaw and the shale  
 appear on the shore of the  
 lake 500 paces ~~from the~~  
 northwest along the shore  
 of the lake. At 500 paces the  
 top of the rockport is at  
 the level of the lake.

A



19

## Shanty Rapids

1903

400 feet of ls. combining upper & lower Rockport types.

Road in sect 34 -  
 1st Exposure of 2 or 3' of granular  
 crinoidal Genshaw with large  
 Spinifer. ~~Up the hill~~ This exposure  
 is about  $\frac{1}{4}$  mile from intersection  
 with road on N line of sec.  
 About .2 mi S & up the hill, on the  
 brow of the hill is Genshaw with  
 large Pentamerella, dipping S.  
 About .2 mile over hill & forming  
 south slope of hill is steeply  
 dipping black dense ls.  
 Under this is perhaps 1 foot  
 of shale with Strophodonts,  
 Clonites, Schizophoria, large  
 Monospirifer. This shale  
 suggests that just below the  
 Killians & the black ls.  
 suggest Killians

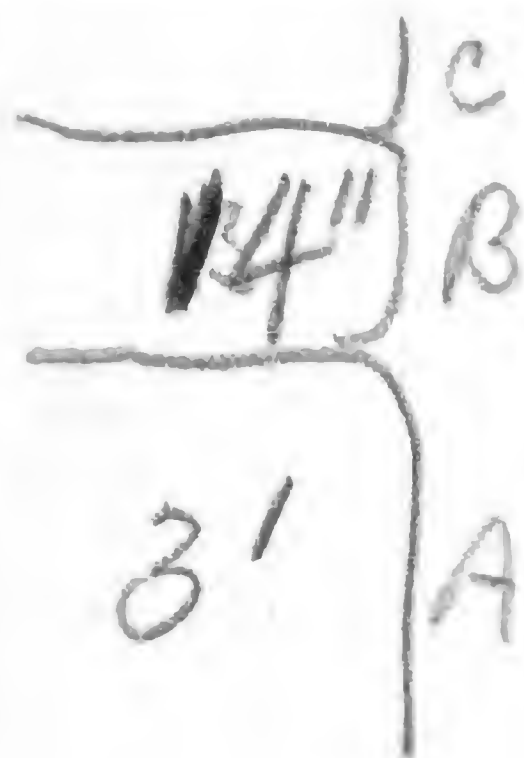
The exposures are 1, 2, 3.



1904

J22<sup>3</sup>  
20

Exposure on US 23 1 1/4 miles  
west of the City line (west side)  
of Tower



A - Dark limy, friable shale  
with *Cyrtina alpenensis*, and  
small *Strophodontia*. 14"

B - Dark gray to black ls.  
with *Pholidoschisma*, *Chonetes*,  
large *Spinifer*.

C - Dark shale. ?

This section is same as that  
on hill (Exposure 3) one mile  
north of Tower and definitely  
places the section at Tower  
Dam in the Genshaw. This dark  
limestone (Bed B) may be basal  
Killians, the bed A is certainly  
higher than Genshaw.

2/

June 23 1905

Qry SE of LeGrand

run

7 1/2'

Light gray ls, scattered conoidal columns  
large Pentamerella of Afton type  
big Stroms.

6-7'

Dark gray ls, with sooty partings  
D. Pinna topophyllus, sheet-like  
Stroms present - like Rockport  
lower contact irregular

5'

C massive brown gray ls.

11'

B. Brownish gray ls, with pitch, breaking  
into flat plates in lower 3-5' more  
massive above

3'

A - light gray, porous

covered  
3'

This section combines rocks  
of Upper Rockport, lower Rockport  
& Seneca type.



22

June 23'

1906

About 2' of platy gray ls. in ditch.

*Gonophorinus*, *Dacrydella*, big sp.  
*Microzoster*, *Sclerophoria*

0.2 mile ~~far~~ east of 1st S road  
W of Segrand.

June 23<sup>rd</sup>

Lower shaly beds with *Productella*  
and small *Strophodonts* suggest  
Genshaw. Upper dark ls on hill  
suggest Killians. Near their base  
I found *Capitula* of *alpenensis* type  
suggesting upper Genshaw.

Afton Qy

Rough section

*Pentamerella*  
beds

sorty beds B

gray beds  
of upper  
Rockport type A

23

# Section in Marvin Bay 1907

18 1/2'

Massive bed 4'

2'

2'?

2'-

Massive heavy-bedded ls. with imoid  
columnals, brown gray, *Pentamerella* of Afton  
D-type - Correlates with *Pentamerella* bed  
at Afton. Contains *Pismonophylloids*

C - light gray fine grained ls with large Stroms &  
molluscs

B - Covered

A - Black, sooty limestone, Possibly  
correlates with B. of Afton Bay and  
D of Bay SE of LeGrand



1908

24

# Beebe School

1st rock N of school is 1000 paces  
from intersection: About 2 feet  
gray ls. with crinoidal fragments.  
*Strophodonts*, *Pentamerella*,  
*Strom.* (small), *Cyrtina*, *Productella*,  
*Pholidostrophia*, small *Schuchertella*

1000 - 652 paces covered

~~652~~ At 652 - 602 - Gray ls. with  
an abundance of ostracods  
overlain by porous ls. with  
*Cypriindites*, corals. Above this  
are limestones, as shown by  
loose blocks, with *Schizophoria*,  
*Productella*, *Cyrtina* & *Pentamerella*  
All told these are about 6' exposed  
here

602 - 416 - covered

416 - 276 - gray barren shale

Ganshaw in Payson R. 80' below  
Sorenson Ay.





25

June 24 1909

Lower Alpena with *C. coronatus* is 0.35 miles S of Killians ledge on Long Lake Rd. This lower Alpena is 1.1 miles south of west turn ~~at~~ below Long Lake

June 24<sup>1</sup>

26.3  
25.05  
1.5

Black ls. with large *Spirifer*, *Oriskanyophyllum*, *Club*, *Alce*, *Favosites*. This is Killians or black Genshaw 2.5 miles on 638 from US 23.

J 24<sup>2</sup>

Genshaw with big *Scler.*, *Pentamerella*, *C. coronatus*, etc.

J 24<sup>3</sup>

2.75 mi. west of turn. Genshaw with many *clavos*.

J. 24<sup>4</sup>

Some 8-10' gray ls. abounding in globular *Pentamerella* of Afton or Lower type.

J 24<sup>5</sup>

Dark Gray to black sh + shaly ls. with *Athyris* & *Cyrtina*. Same as Killians S. of Poseb. This is Killians with many digitate *Favosites*.

26

June 25

1910

Under ninth Ave bridge is in  
river with *C. coronatus* &  
many *Cammarotoechia*. Same as  
June 13 and as Norway Point.

R. E. Wilson, Fire Chief

Mr. & Mrs. Will Stoddard  
313 - 4th Avenue  
Alpena, Mich.





1911

27

June 26- Leiorhynchus locality  
on Hwy 23 south of Alpena is  
about 17 miles south of the  
city.

According to Mr. S. Ambrocia  
~~June 27~~ occurs only in the Widdow.  
~~132.90~~ Peculiar Microspinifer with  
emarginate anterior occurs  
in Widdow.

Send Mr. Southworth  
a Tully paper. Also  
explore Diers reports. Send  
Mr. S. Athyris from Jim Beels.



132  
40

137.90  
16 63  

---

154.53

(50)

Pennsylvania



1912

Loc. 1.

Pennsylvania 1937

Mexico member of Marcellus -

Behind church & school, north side of Mexico - unfossiliferous thin-bedded ss. and thin dark sandy shale suggesting the Sherburne or Benwyn of Onondaga Valley.

Loc. 2 - Section in vicinity of Huntingdon, Pa. Oniskany appears on Hwy 22 about  $1\frac{1}{2}$  mi. west northwest of Huntingdon.

Marcellus ~~is~~ just east of road to McConnells town about  $\frac{1}{8}$  mile east of the McConnells town rd. (Rte 22 at Smithville) Black shale, fissile, but less so than in N.Y. ~~Thin~~ Two thin bands of blue gray ls. Upper one with small Proetus, Ambocoelia, Parenka, Nowakia.

~~Below & upper ls.~~ Between ls. concretions common, some as small as peas, with crude radial structure

Loc. 3 -  $\frac{1}{4}$  mi S. of bridge over Juniata Huntingdon. 30-40' of dark gray sandy shale, pencil cleavage, rusty weathering white streak. Vitulina abundant, other fossils scarce. B.W. says this cut is near middle of Hamilton. Rest of Hamilton along road to SE up the hill  
Loc 4 - on Pa 46 - 0.3 mi. S of Huntingdon Co. line, fine exp of Onondaga, with Marcellus exposed to S for a mile or more



1913

Get location

Loc. 5 - Eichelburger ~~town~~

Tully dips 67° S - 33" thick, nodular dark limy shale 15", shaly ls. 10", West Brook bluish limy sh with a. spines 7-8". Lower 25' contains Enamella, Echinocoelia, Hypothyridina.

Hamilton - about 75' - no Vitulina seen. fauna 2' below Tully is Elytha, Atrypa, Cyrtia, C. coronatus, Impidoleptus common throughout. W. of Eichelburger town on Pa 26 dip flattens as one goes down through Hamilton to Ourskany for one mile.

Aug. 31

Loc. 6 - just northeast of Hannah on U.S. 220 - exposures of black sandy ~~Massachusetts~~ ~~Massachusetts~~ Burkett

Loc. 7 - Route 220 - about 1/2 mi ENE of Julian - Upper Hamilton

Danese

Shaly ls

+ 30' thin ls beds

Massive ls

Echinocoelia

Sp. atrypa

Loc. 7 - Curtin - Tully

About 35' of Tully limestone - overlies a thick layer of Hamilton contain Atrypa, Athyris, Corals. which suggests the Sp. Atrypa bed of Cleland.

The Tully starts with sandy beds having nodules of limestone



N46E 26°N

1914

This continues, for 3'. This part contains Echinocoelis, + Schuchertella

8' below top is a zone with A. spinosa. This is O.W.B.

C. amara was found near middle. In between these beds + above S. spinosa are shaly ls.

This locality is  $\frac{1}{4}$  mile ENE of Curtin where a small stream from N joins the Bald Eagle.  
Dip + strike N46E 76° N. 37 paces over outcrop.

### Lock Haven

Grand Tully section just W of only bridge across the Susquehanna River, N77E36° NW magnetic. About 185' of shaly ls. mostly unfossiliferous. Upper 15' to 20' contains fossils, mostly small encorals. At. spinosa said to occur here.

Tully on Williamsport post sheet, 2nd crossing over Susquehanna east of Jersey Shore. At 553 number on map. 200 I felt of Tully with many fossils of fls. On Hwy 54 Pa. Excellent collecting in upper beds. On east bank of River





1915

Large quarry in Tully in Jersey shore  
right South of R in Porter East  
edge Lock Haven sheet and just  
west of stream in Dennison  
Hollow and north of RR tracks  
near Jersey Shore Sta on  
N.Y. Central R.R.

September 1.

N 82 E 87 N  
E



Section  $\frac{1}{2}$  to one mile SE  
along the railroad from Lamy's  
Creek. Here the Tully appears in  
two anticlines. The easternmost  
shows Tully and Hamilton. The latter  
is separated from the Tully by a gully  
and some 15-20 yards. The Hamilton  
is N 82 E 87 N which is quite different  
from the Tully dip and strike which  
are N 71 E 50° S. The Hamilton is  
sparsely fossiliferous dark gray  
shale with Bucanopsis, Pholidella  
and Vitulina. The Tully is ~~about~~  
exposed for about 175' horizontally  
and is overturned a little to the  
north. The Buckett overlies the Tully  
but is crumpled. Then the Harrell  
appears over the Buckett and  
extends for some distance to the  
west flattening and then rising  
above the RR to dip southward.  
Then a low anticline of Tully  
appears after a short covered interval.  
On the west limb of the anticline the Portage app



Sept. 1

1916

On road from Pennsdale to  
Huntersville 2-3 miles N of  
Pennsdale, Hamilton and Tully.  
Vitulina occurs below the Tully  
about 10' and about the same  
distance below the Vitulina  
is a zone with Leptostrophia and  
A. spinosa.

Tully massive in lower  
beds becomes shaly above.  
C. aurora found in about middle  
of outcrop. Lowest Tully sandy  
below the massive beds.

### Danville

Excellent section on S. side of  
N branch of Susquehanna  
N 83 E 46 S about one mile SE of Danville  
on hwy 54 to Shamokin, Pa.  
About 35' of Tully N 83 E 46 S.  
Tully massive but very shaly  
fossils rare, Echinocollia in  
base, A. spinosa near top. Top  
very shaly suggesting transition  
to Burkett. Lower contact irregular.  
Vitulina and abundant Hamilton  
fossils 4' below Tully.  
Marcellus about 0.3 mile  
East of turn ~~to bridge to~~  
in Riverside



1917

Sept 2

37.8

38.3

41.1

On US 15 just over Shamokin Creek on the edge of Sunbury. Massive sandy Hamilton grading down into dark sand shale of Cardiff type. This is exposed for  $\frac{1}{2}$  mile to the bend of the road to the east.

At point where road hits RR again around hill at words Pa R.R. on map. appears Marcellus faulted down against Oniskany.

On Hy 15 Onondaga appears Onondaga on both sides of the little stream just N of Selinsgrove Junction. The stream is on the axis of the anticline. The Onondaga consists of beds of limestone up to one foot thick separated by dark shale. There are two bands of black sooty shale. The ls is dark and both sh. & ls. weather to ash gray. Marcellus appears on N side of outcrop as black shale with brown streak but breaking into stout flat flakes.

Up the hill to the sw the Onondaga and Marcellus are again exposed. The O. is separated from M. by about 10" of micaceous ss.



1918

Hy 15 - opposite Hallowing Run.  
See W. + Kiddle Hallowing Run section  
Hy 15 about  $\frac{1}{4}$  mi N of intersection  
with road up Hallowing Run.  
Sandy shale breaking into fine  
long strips. Near bottom of section  
is a green sh with many fossils  
suggesting Stafford ls. The rock  
comes ~~just~~ within 50' of top  
of Marcellus.

Higher opposite Hallowing  
run are swayer rocks with  
Gibbertoceras, Titulina, Inopidella.

Junction of Hy 15 + 225 -  
Hamilton S side of road with  
Titulina, At elbow of road is  
about 1' of Tully with Echinocelia  
and above this Genesee.

Dalmatia lies on Wills Creek  
and just S of ~~city~~ village is  
Heldenberg & Oniskany and ~~hill~~  
Onondaga, up the hill appears  
Marcellus with Turkey Ridges  
so near bottom.

25  
16  
09



1919

Excellent exposures of  
Montebello on railroad  
at end of Fisher Ridge  $\frac{1}{2}$  mile  
N of 2nd small Creek N of  
Mahantango Creek or about  
 $\frac{3}{4}$  mi N of Mahantango Creek

The Montebello is heavy  
bedded and conglomeratic  
with fossils occupying  
lenses and tubercle  
divisions. Willard regards it  
as a sand bar.

1920

The Tully in Pa. thins from its maximum at Lock Haven and vicinity southward, westward & eastward. ~~At~~ The Susquehanna valley at Fiddlers Run there is only one foot of Tully.

The Hamilton along the Allegheny front appears not to be divisible into formations or members but seems to represent the whole of the Hamilton. The formation is mainly dark sandy shale throughout.

Vitulina appears near the middle of the mass and occupies many feet, at least 40 and perhaps more. As one goes northwest from in the Penn. Hamilton he leaves the shore and the formation becomes more uniform. This is the off-shore direction. The coral reefs in eastern Pa. are Centerfield in the shore zone.



September 3 1921

Section on Juniata River on  
by U.S. 22, ~~about 1/2~~ half-way  
between Losh Run + Half-Falls Mtn.

A- Vitulina zone of Hamilton

B- Nodular, sandy + shaly  
ls. with Hypothyridina near  
top, Echinocoelia and Leisopygia

E C.- Bluish shale with A.  
spinosa, Leptaena, etc.  
West Brook fauna.

10 1/2 - 11 1/2

D D- Greenish gray to dark olive  
with small corals + Aulopora?

3-4'

C E Burkett - Separated from  
Tully by dark gray to black  
color.

2 1/2'

B

Vitulina  
zone of  
Hamilton

A The Leptaena of the Md.  
Survey reported from the  
Hamilton may be in the  
Tully.





U822 - N of Tully loc. 1922

- A - 20-25' of Montebello ss.  
beds as thick as 5' conglomeratic, with  
P. flabellum. Base of succeeding bed sandy  
B. sandy sh. with P. flabellum 8'  
C. alternate heavy ss + sh. C. vicinus 20'  
C. coronatus, S. granulosa, J. caninus 10'  
D. sandy sh. Storm-roller at base 20'  
E. Heavy ss + sh. 3'  
F. sandy sh. S. granulosa. 20'  
G. Heavy beds ss 45'  
H. Soft flaky sandy sh. P. liata 25'  
I. Thin-bedded ss. 20'  
J. Coarse heavy, massive ss. 20'  
K - iron ore bed 1'  
L - bluish sandy sh breaking to chips 8'

Bluish  
color



M - Same as L - Vitulina at top 70'

New Bloomfield sheet

Section on S in Susquehanna, 1/2 mi  
SE of New Bloomfield

Vitulina zone in N bank of  
quarry, Tully in road at middle  
of quarry and at east end.  
seen on road and east  
end of quarry



1923

Tully about 8' thick, *Leiorhynchus*  
+ *Esthmoecelia* + *Ambocoelia*?  
in sandy zone in lowest 18'!  
*Atrypa spinosa* 6' above  
base with many WB species

811

Hy 274 about 1/4 - 1/2 miles NE  
of Road between New Bloomfield  
& Duncannon on N side of  
small hill touching H in  
wheatfield and S.E. of W in Dark  
Hollow. 2 miles E of inter-  
section of Pa 34 & 274

Tully - Hamilton - Seneca  
same as preceding with  
*Leiorhynchus* at base.

Section 1/2 to 3/4 mi WNW of  
Dromgold on Sherman's Creek.  
Montebello, 700' below top of  
Hamilton abounding in  
*Newberrya* + sp. *Tullius*? Whole  
section along road to west



1924

Sections east of Hainburg

S. end of Deer Lake -  $2\frac{1}{4}$  mi NE of Auburn  
on Hwy 122 into Lumbury  
at Orangeburg, sandy lumpy  
shales with *Glyptodonta*,  
*Cornellites*, *Pandora* class, *C. coronata*  
suggesting Delphi.  $\frac{1}{4}$  mi N of  
junction of 122 + ~~895~~ 895. To Auburn.  
Oriskany on S side valley just  
E of Auburn.

Walk track <sup>NW</sup> from Auburn  
for  $\frac{3}{4}$  mile, contact with Portage  
about opposite mid. point between  
A + D in Railroad. Hamilton  
extends up along Bear Creek  
Valley

At Summit go N on 83 many  
cuts.

79.7



1925

Section 0.3 mi. S of intersection of Pa 83 and 443. and 3.7 miles north of Summit Sta.

About 50'± of greenish and bluish shale with *Echinocoelia* and *Leiorhynchus* at base, and clams, *Hyptaena*, *A. spinosa* above.

Lilly is at N or lower end of gy. *Vitulina* is in ditch just below gy. on W side of road.

Summit - Pine Grove Hamilton

S. side Swatara Creek 3/4 mi SW of Suedberg. Coral bed possibly Centfield

Due East of H in Philadelphia in Swatara gap on road on east side creek at bend.

Onondaga resting on Silurian and overlain by ~~Dev~~ Marcellus.

Down from Suedberg along Swatara Creek to the gap is Montebello ss.



1926

September 8, 1938

Pennsylvania

88 - About  $\frac{1}{4}$  mile south of Rupert on Pa St. Hwy 42 & fine cut of Portage for about  $\frac{1}{4}$  mile or more. Williams & Kendall's Catawissa section on east side river opposite Rupert.

Bloomburg, Pa

88' - Section along Little Fishing creek on Hy 42 just above confluence of Little Fishing Creek & Fishing Creek. Marcellus exposed and of Cardiff type and located at bend of road and for about 0.1 mile to north. Dark rock here proves not to be Marcellus but well up in Hamilton about 60' below top.

At about 0.10 mile from <sup>road to W</sup> bend above bend Tully appears. Shaly as at Lockhaven & S of Danville with *Ectinocoelia* at base and *A. spinosa* & *Lophosoma* in upper part. Tully  $N 76^{\circ} E 70^{\circ} N$   
 Section Black sh.  $N 76^{\circ} E 17^{\circ} N$   
 from blk sh to Vitulina 125'  
 From Vitulina to highest Tully 80'  
 From Tully to lowest exposed Braillier 240'  
 Braillier to Trimmers Rock 140.  
 Reading Trimmers Rock  $N 78^{\circ} E 46^{\circ} N$   
 Tully between 30-35' thick.



1927

Vitulina zone contains also Sp. tullius of small variety.

582 - On road in river under bridge at Belwick

583 - 4 1/2 miles S of Shickshinny on U.S. 11 - strongly cleaved upper Tully with gentle dip to North. Lophileasma atypa. On N limb of Anticline. Hamilton 3/8 mile to South.

584 - Tully 1/2 mile NW of Egers Grove on road over to Demotte School. Genesee exposed just NW of house & Tully about 0.2 mile west of house and exposed for fully 0.1 mile on top of hill. Very low dip. Hamilton exposed just over Little Fishing Creek on west edge of Millville and along road over hill to Spruce Creek. Genesee down hill from about 0.1 mi. W of house to bottom of hill.

Hughesville  
sheet



1928

Sept. 9, 1938

Cut in Moscow 2 miles NW of Northumberland, Pa.

Cut begins on N side of gully. About 10' above base of section comes *Vitulina* and *Tropidoleptus* in abundance in a sandy layer N68E 51°S.

About 30' above 1st *Vitulina* is a second zone. About 5' below this second zone comes large *Cypicardella*, *Chonetes* n. sp., *A. undulata* and *Tropidoleptus*.

About 50' below top *Sp. belphegi* abundant. On upper 20' come *Elythia*, *Atrypa*, *Vitulina*, *Attheyia* sp. sculptilis.

S91 - About 1/4 miles N of Mansdale on Pa 54. Humilton with *Vitulina*.

S92 - 1.55 mi. S of Washingtonville on Pa 54 about 30' of *Marcellus*.

Winfield S93 - On Pa 404 1/2 mile S of Winfield excellent cut in *Marcellus* with *Leptynchus*, so lenses in lower part of cut.





1929

594 - Section opposite Pease Rk bridge on West side river about 1 mile below Mansville. Excellent section in Montebello ss. Base of Montebello exposed about at bridge head.

87 paces from end of cut a shale 15-20' thick appears. This runs to 94 paces.

94-187 - At 187 a thick conglom of *Sp. tullius*? 2-3' thick.

187-248 - ss with some interbedded shale. N 78 E E 30 S overturned.

At 248 a 2' bed with large cup corals = possibly Centerfield

248-308 - to end of cut. Top contains big button-shaped crinoid stems.

308-406 - covered

406 - About 50' fine greenish shale with *Vitulina* at S end and 3' Tully about 8-10' from S end. *Echinocochia* appears to be mixed with West Brook fossils. Upper end of section + contact with Genesee not determined. Tully just 100 paces north of top of Montebello ss.

Sept 11

Tully 100 paces N of Montebello ss. *Vitulina* at top of Hamilton. *Strophomena* found about 2" above *Vitulina*. Lower 6' of Tully abounds in fossils.



Lowest 3' of Tully contains  
*Echinococulia* with *Leiodonchelus*  
at very base. Tully exposure containing  
29 paces above *Vitulina*.  
Contact of Tully & Genesee (Berket)  
sharp. Tully olive color & Berket  
black. Upper Tully contains  
*Bembexia*, *Chonetes* & *Apicardella*  
Tully probably 40-50' thick.



1930

September 15, 1938

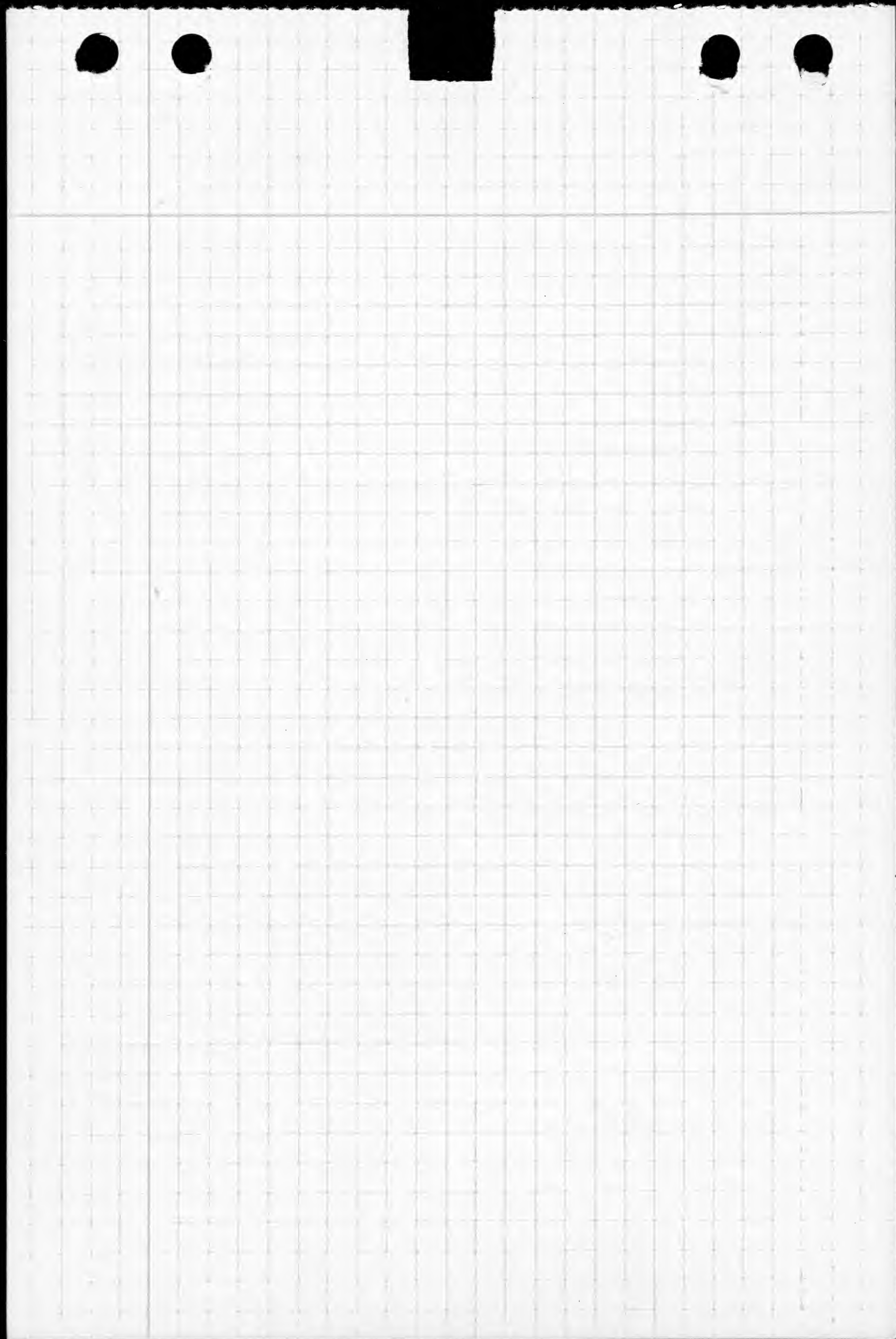
Section on ~~Phib +~~ Reading R.R.  
north of bridge over highway Pa  
895 on east side of Auburn.

Base of Tully strikes E and W and  
dips 35° North. Base a hard  
ss. with *Leiorhynchus*. Above for  
10-15' *Leiorhynchus* + *Sp. mucronatus*  
common.

25 paces above lower *Leiorhynchus*  
bed is an 8" band crowded with  
*Echinocoelia*. Above this comes  
softer shales abounding in  
*Tropidoleptus*. Total Tully exposure  
is 60 paces. Base is exposed 535  
paces from bridge.

16 paces below lowest Tully to  
*Vitulina*





Nov. 6 1931

Compass bearings magnetic N.  
Reach Union School from

Frederica. Take 76 road to school  
Outcrop in creek. N 64 W 30° NE

0-26 light brownish gray ls with  
large chonetes and a spiniferoid  
like Sp. lucasensis. 10' exposed.

20 feet exposed, dark, weathering  
heavy bedded ls. Chonetes  
abundant. Chert in middle

50-60' exposed

26-52 covered

52-78 Light & dark weathering  
limestone with small chonetes  
and Microcyclus in lowest 10'.

Leptaena, small corals, Schizophoria  
Dip 25° in lower part crop but  
flat in upper part. Microcyclus  
found in whole section

78-105 covered

105-118 - light weathering cherty ls  
with Schizophoria. N 70 W 32° NE

118-195 to road.

195-261 - side road to NE

261-457 - stream - road cross

457-583 granular limestone  
brownish gray abounding in  
corals. Uppermost 10' smooth  
blue gray, brown weathering

583-683 - Union School.

The structure of the beds at  
the top containing the corals  
cannot be ascertained as the

1366  
347  
1705



1932

exposure seems to consist  
wholly of slumped blocks. These  
could be seen in the bank of  
the stream for perhaps 100 yds.  
Although these upper beds  
suggest the Lingle very strongly  
I failed to see Centronella or  
Vitulina.

Nov. 7.

In morning went north on  
Perryville road toward St. Marys.  
Just north of Perry County line  
road to Minnth turns off. Take  
this road to a point about 1 1/2  
miles north of Cludgden  
School. By side of road are  
crumbly green and red Bambridge  
shales with Pisocrinus and  
blastoids which may be picked  
up. In the woods above this  
locality Bambridge limestone  
contains pockets of fine fossils.  
We collected some lumps here.

In afternoon went to  
"Ironblosome Hill" for Bailey fossils.  
These occur next a fault  
bringing up the Bearoasis  
against the limestone.

Remainder of afternoon  
was spent collecting Little  
Saline ls. at the quarry.



1933

From the wedge of Beauvais faulted against the Bailey on slope of hill and on top of hill we found blocks of chert containing a Chonetes strongly resembling those found under the Microcyclus beds of the St. Laurent at Union School

November 8

Send Bell a Silurian blastoid for the one taken from him at the Pisocrinus locality.

In morning collected Platten along southwest face of hill about  $1\frac{1}{4}$  miles SSE of River and Vases. At base of hill Joachim is exposed as yellowish weathering earthy ls. Platten is dove-colored, fine-grained suggest Lowville or Washburn in its lithology. a rhynchonellid and a species of Rhynchocamara occur here.

After lunch Cooper collected Beauvais about  $\frac{1}{4}$  mile north of four corners south of Beaman School. On lowest exposure about  $\frac{1}{8}$  mile from intersection Newberria occurs. Above the Newberria at last exposures seen several clams were collected. Nowhere was a typical Hamilton fauna seen.





1934

The upper part of the Beaman exposure east of four corners below the Beaman School becomes calcareous.

Excellent Platten exposures are to be found about  $1\frac{1}{2}$  mile NW of the Chicago Summer camp Building 5, on both sides of a small creek and along the old road. Silicified brachiopods are common.

November 9

Spent morning packing fossils. Shipped 756 pounds from McBride.

Afternoon headed for St. Louis. South of Barnhart on US 61, 67 and just south of Rock School under church (Stop 51, K. D. Sec. Field Conference 13) is exposure of Decorah. We collected the 10' of rock above a green shale and below the Kimmswick. *Pionodonta* and *Rafinesquina* were particularly abundant. *Sowerbyella* occurred in lower part of cut.

Just north of school take road east to Glen Park. Road forks and a great quarry can be seen east of fork. Take left fork to Glen Park Station.



1935

Walk down R.R. to lime plant  
on RR cut is Kumsawick  
overlain by Curdsville.

Type section of Glen park ls  
is on nose of hill west of RR  
cut and opposite lime plant

RR cut at Gauge excellent  
for Decorah.

November 10.

Left Valley Park in morning  
in downpour and went on  
to Louisiana, Mo. By time we  
reached L. the weather had  
cleared and came cold.

Called on Mr. F. R. Long. Sent  
Mr. L. Savages paper on the  
Alexandrian of Illinois.

Left Mr. L. and headed for  
Quincy. Collected Decorah  
by roadside (U.S. 61) just  
south of Salt River not far  
north of New London, Missouri.  
After collecting went on to  
Quincy for supper and to  
Clayton, Illinois for the night



1936

Vacation, July 1-22, 1940

July 1.

New York City to Danville, N.Y.

July 2

Danville, N.Y. to London, Ontario.  
Collected at East Bethany; visited  
Letchworth Park.

July 3.

Collected with Southworths at Tile yard,  
Commander Finlays and from pit  
on Port Frankes Road.

July 4.

Collected at No 4 Hill all day.

July 5.

Thedford, Ontario to Alpena, Michigan

July 6.

Morning in pit on west side Alpena  
Cemetery, afternoon spent in Potter  
Farm fields and at south end of  
Long Lake.

July 7.

Visited Tabernished Shale pit Alpena  
Portland Cement Co. Collected all day.

July 8.

Visited Rockport Quarry. Crinoids almost  
exhausted.

July 9.

4-Mile Dam, Norway Point Dam.

July 10.

Partridge Point and Genshaw on  
French road.



1937

July 11.

Rain - went out on new U.S. 23. For a distance of 5.75 miles SE of intersection of U.S. 23 and road to Poso, outcrops of Rockport ls may be seen. Fine fresh cuts. 2.4 miles SE of same intersection about 8' of Bell shale can be seen overlain by Rockport limestone. Excellent view of contact.

July 12

For 20 miles along U.S. 23 exposures from Bell to Genshaw may be seen. They begin just east of the D. & M. R.R. crossing SE of Rogers City. 0.2 mile east of crossing a large bluff shows Ferrow Point shale below with Genshaw above.

July 13.

2 miles east of Bolton road small patch of Genshaw occurs. East of here exposures become common and include uppermost Genshaw with many corals and lowermost Killbuck with large Pentamerella, Atrypa & Cyrtina. Specimens are very abundant and occur also in the gravel.

# Traverse U.S. 23

Railroad + U.S. 23 intersection	—	399.8
Jy 12 Ferron Pt - Gushaw (coll.)	—	400.0
Jy 12' Ferron Pt (coll.)		401.65
Jy 12 <sup>2</sup> probable Rockport	—	402.1
Jy 12 <sup>3</sup> Rockport	—	404.0
Jy 12 <sup>4</sup> Rockport (coll.)	—	404.3
Rd. to Presque Isle Harbor	—	407.5
Rd. to Posen	—	410.
Jy. 12 <sup>5</sup> Ball contact (coll.)	—	412.3
Jy. 12 <sup>6</sup> Rockport	—	412.5
Jy. 12 <sup>7</sup> Rockport	—	412.7
Jy. 12 <sup>8</sup> Rockport	—	413.0
Jy 12 <sup>9</sup> Rockport	—	414.1
Jy. 12 <sup>10</sup> Rockport	—	414.5
Jy. 12 <sup>11</sup> Rockport	—	414.6
Jy. 12 <sup>12</sup> Rockport	—	414.8
Jy 12 <sup>13</sup> Rockport	—	415.2
county line Presque Isle - Alpena	—	417.5
Gushaw		420.4



1938

Lakenwood

420.85

July 14 - Collected Rockport at  
Rockport Ar. Collected Potter Farm  
1/4 mi. S. of 4-mile Dam for Ellen  
Collected on west side Long Lake  
mainly Lower Killians

Inverse of U.S. 23 from D+M RR  
Crossing to Lakenwood.

0.4	East of RR -	Farm H. 7. 7. 7.
1.85	" " "	Farm 1st
2.3	" " "	probable Rockport
4.5	Rockport with	Choneter
12.5	Bell contact	

Illinois 1942

Aug. 1. Left Washington 9:00 A.M. and arrived in Wheeling, W. Va. 6:00 P.M.

Aug. 2. Left Wheeling 5 P.M. arrived Council Bluffs 7 P.M. Decided to take northern route for short stop at Pipe Creek Falls.

Aug. 3. Spent morning at Pipe Creek Falls. Collecting in park. River exceptionally high. In afternoon went to Frame Stone quarry, 3 mi east of Legansport to see Devonian. Collected corals. At Delfia, Ind. examined a shale pit in Delfia shale. Arrived Danville, Ill. at 8 P.M.

Aug. 4. Danville to Urbana. Urbana to Elizabethton to call on J. M. Weller. Spent night at Elizabethton.

Aug 5. At 2 miles west of SE ESW 1-135-2W 3/4 mile SS W of St. Pauls Church. Total exposure of 70' of dark cherty limestone, the chert is in thin layers of 1/2" to 1" thick. It is fine grained and contains a few fossils. The chert is dark and contains small brachiopods and small chert nodules.

Aug 5. Bluff of about 40' of dark chert shale. Brown, green and red. Dip towards south. Rock is unconsolidated and angular. About 20 yards comes another bluff dipping upstream. This is a fact. The chert is dark and contains small brachiopods and small chert nodules.



(2)

1948

of glauconitic ss. Wallers says this may  
be top of ~~green shale~~ (Springville)  
This in Middle center east half  
NE  $\frac{1}{4}$  sect 2 - 135-2W.

Aug 5<sup>2</sup> N branch Cope Creek SW NW  $\frac{1}{4}$  35-135-2W,  
3 mi W of Mill Creek.

Section showing Muschenheimer with  
*Leiorhynchus* probably resting on Dutch  
Creek which seems to be in place.  
Muschenheimer contains thin sandy-limy  
beds with a few corals, *Chonetes* and  
*Antrocoelia*. Fingle not in place but  
large blocks of it slipped off hillside

Aug 5<sup>3</sup>

~~N branch Co~~

Center NE  $\frac{1}{4}$  15-125-2W. ?

New road cut showing 15' ± of  
Dutch Creek resting on Green Creek Chert.  
Soil above Dutch Creek yields silicified  
*Microcyclus* and other corals.

Aug 6.

About 10' Grand Tower Is. on road  
to Alto Pass about 3 miles W & a little  
south of Cobden. Coarsely granular  
light gray and brown limestone  
massive beds. Contain *Sp. macrum.*  
and *Angstingeria*. According to Waller  
this near the top of the ~~Atoka~~  
Grand Tower.

Aug 6<sup>2</sup>

Grand Tower just W. cent of section 1  
just below word Union W of Alto Pass.



(3)

1848

Aug. 6<sup>2</sup> ~~SENE~~ ~~SENE~~ 2-115-3W just S of county line.

Aug. 6<sup>3</sup> Backbone ls. = Little Saline center section 23-115-3W, tributary Hutchins Creek.

Aug. 6<sup>4</sup> NE SW 9-125-2W, 4 mi. NW. of Jonestown

August 7 now dll. 127  
Road to Alto Pass / Dutch Creek is exposed 1 mile north of intersection with dll. Hy: 146. Clear Creek underlies it and is exposed just S of turn off to the State Forest.

Clear Creek: - Light gray finely granular hard limestone with surface but / conchoidal fracture. Contains irregular beds of yellow chert often brown stained and red brown where considerably weathered. Some of the chert where freshest is gray-white. Fossils occur throughout. *Amphigenia* is common. At this place the Clear Creek is nearly horizontal. Top of Clear Creek abundant in *Ecdyomena*, sp. *hemicyclus*, *Amphigenia*, *Leptaetophoria* sp. *divanista* is also present.

Dutch Creek: - just E of center NW 1/4 NE 1/4 15-125-2W on west side new road to Alto Pass one mile N of junction with dll. 146. Dutch Creek is 12 feet thick, dips east about 6°. Contact with Clear Creek sharp. When fresh is white, sugary, friable sandstone stained red in most parts. Bedding surface shows reddish limonite deposited on them. Lower beds somewhat thin-bedded as in uppermost 2'. Middle beds massive. Fossils very abundant particularly *Planolites* and *P. sub*.



(4)

1849

a conical Favosites, cup corals, Amphigenia, Balanus, Outcrop 175' long

"St. Laurent" - Above the Dutch Creek in the red residual soil were found Microcorals and an abundance of small cup corals. We think this indicates the close proximity of the microwater bed to the Dutch Creek. Along with the corals are plates of yellow weathered shale suggesting the Misenheimer. The corals are almost completely confined to the south side of outcrop. A few on N side suggests that "St. Laurent" went over top of Dutch Creek. Grand Tower is exposed about 1/2 mile north on a branch of Dutch Creek and this may be southernmost exposure of Grand Tower.

Aug 7<sup>1</sup> SWSE NW 1/4 34-115-2W in stream on east side Alto Pass road 2.7 miles north of Dutch Creek outcrop in Dutch Creek with patches of sandy Grand Tower on it. 0.35 miles farther south is Grand Tower beside road in a fine cut. These two sections are essentially on the strike and indicate 20-25' as the thickness of the Grand Tower.

Aug 7<sup>2</sup> Grand Tower road cut NW 1/4 NE 1/4 34-115-2W - Heavy bedded light gray and gray brown limestone in beds 3' or more thick. About 13' exposed. This taken with position of Dutch Creek .35 miles south suggests a thickness of about 25' for Grand Tower. Microwater was found in float above outcrop and in crevices.

$$\begin{array}{r}
 225 \\
 2 \\
 \hline
 450 \\
 113 \\
 \hline
 563
 \end{array}$$

$$\begin{array}{r}
 1045 \\
 583 \\
 \hline
 3135 \\
 6270 \\
 5225 \\
 \hline
 588335
 \end{array}$$

$$\begin{array}{r}
 1908 \\
 583 \\
 \hline
 5724 \\
 11448 \\
 9540 \\
 \hline
 1074204 \\
 58 \\
 \hline
 165 = 52
 \end{array}$$

1045



137  
- 17  
120

(5)

1950

Aug 7<sup>3</sup>

On Green Creek center N line 23-125-241.  
Good exposure in bluff where stream  
cuts against it. About 15' granular limestone  
marble-like in texture and with  
*Pholidostrophia* & *Sp. lucasensis*. On top  
of this is *Microcyclus* bed. Above in  
woods are loose blocks with small  
*Chonetes*, *Sp. minutus* and *Tropidoleptus*.  
Along highway 1/2 mile east of bridge over  
Green Creek occur blocks of very hard  
limestone with *Tropidoleptus* rare. 30-40'  
up on hill slope shaly beds contain small  
*Chonetes* and big *Strophodonts* suggesting  
beds above *Microcyclus*. Nothing is in place.

Aug 8. Darty Creek

A81 - About 3' of Dutch Creek in bed  
of Darty Creek. This 100 paces down from  
sharp elbow of stream. It is 200 paces  
from Dutch Creek to east elbow where  
stream becomes more parallel to old  
road. 225 paces above the Dutch Creek  
comes the lowest ledge, a jumbled  
mass of shaly, cherty limestone blocks.

The lowest ledge exposed, which is  
nearly in place consists of shaly dark  
limestone with harder limestone bands  
and chert layers. The highest block of  
this layer is about 15' above the level  
of the stream. Rock appears for 60'  
up the slope. About 45 feet up appeared  
blocks of light gray granular limestone  
with abundant *Vitulina* and occasional  
*Tropidoleptus*. Above these blocks  
appears shaly limestone pieces and  
what appears to be cherty gray limestone  
in place. This limestone has the



⑥

2881

Dip  $50^{\circ}$  E  $\pm 110^{\circ}$

appearance of the *Microgaster* bed but we could not prove it.

The lower blue-gray sand contains abundance of *Crinoids*. The usual small *Crinoids* are also present.

At 305 paces above Dutch Creek are tumbled blocks of coralline Hamilton limestone which are not in place. On the stream bank are 5 or 6 feet of yellow gray shale. Above the shale just for about 20' some shaly limestone. The upper beds with thin nodules. These upper beds contain *Sp. parvatus* + *Crinoids* and are tied to the tumbled blocks at 225 paces.

At 425 paces is outcrop of shale just  $550^{\circ}$  E of first house up Dutch Creek. Here about 20 feet of rock exposed. Lowest bed is about 2' of hard slightly calcareous sandstone. Then about 10' of thin bedded sandy gray shale, then 3' of thin bedded shaly sandstone followed by about 5' of thin bedded sandy shale. 15' feet of shale bed carries a *Lingula* in some abundance. The upper bed ~~is~~ of about 8-9' is thin and contains *Leptæna* in abundance. The *Ling. mutila* extends through about 3' and contains about also. The lithology is suggestive of the Alto band. Dip  $16^{\circ}$ .

At 625 paces above Dutch Creek comes outcrop of Alto, about 11' of hard cherty sandstone probably somewhat calcareous. The dip here is about  $6^{\circ}$ . This outcrop is where stream goes NE against the steep bluff. At 725 paces Mountain Glen shale appears in a bluff and about 20-30' occur. The Mountain Glen is in place above the Alto.



1952

A power line cuts over Alto-Fringville and is exactly on section line. Being from section line on road is 670 paces to gully with Grand Tower and ~~then~~ at 700 paces ~~is~~ about opposite Dutch Creek locality.

Dutch Ck - to first Lingle 80'  
Lingle - Alto 57' 184  
Alto - base of Mtn. Glen 41  
Based on a uniform dip of 6° E.

This Saturday at 2 PM we were forced to quit because of rain. This is the 8th day on which it has rained since we left home. So far we have not settled our major problem: the Hamilton sequence. It looks as though much of the Grand Tower would prove to be Hamilton. We have not yet determined the position of the Utulind bed but its presence on Dutch Creek shows that it goes north of State Highway 146.

Aug 9.

Lingle Creek - Bluff in SW 1/4 26-135-24W. -

About 0.1 mile downstream from crossing of Lingle Creek and highway Dutch Creek appears in banks of stream. It is underlain by blue sandy shale much faulted and cemented by limonite.

In a small branch of Lingle creek about 175 paces downstream from road and creek crossing and 100 yards up the branch Dutch Creek is present. It is nearly flat where the branch crosses a wagon road but some 20 yards from the wagon road it plunges steeply to the northeast. On top of this sandstone is a mass of shale with steep dips but showing two flexures. Near the ss. occurs a rotten ls mass with a layer of about above. The ls. mass contains

River gravel  
60' out 5' pit  
Impure  
Creek



1893

Cyrtina and Trilobites. Smith thinks these beds in place. If so our former are much out of place because the Trilobites again appears at the top of the section. Chert appears in the lower part of the shale bed at least in 5 beds. It seems to be to be scattered although a band occurs above the lowest limestone block. All of the exotic material is confined to the lower 13 pages of the exposures on the road 30' above the ss. The dips and strikes of the shale do not conform to that of the ss. Furthermore considerable shale appears below the sandstone near the branch and road crossing. The boulders ~~are~~ are rimmed with secondary limestone and some of the ls. altered to limonite.

T. Alto

D. covered	8'±	Gray very fine grained ls. with crinoid stems
H.	1 1/2'	shale?
G	3-3 1/2'	shaly weathering hard ls. with scattered chert
F	3'-	Shale?
E	6'	Hard sandy ls. in lower 3' but oolitic below <sup>upper</sup> foot
D	4'±	with large corals, Centronella,
C	11'±	Yellow sandy shale as chips in bank.
B	18"	Rather fine sandstone
A	18'	Murchison



(9)

1951

D - The oolitic part comes about one foot below the top of D. Bed D. apparently thickens and thins somewhat also becomes hard and sandy where fresh.

May = oolite bed at Duddy Creek.

F. Hard limestone bed about  $2\frac{1}{2}'$  showing but part buried making probably 3' or more. Scattered chert in small irregular lenses and nodules. Fossils: Graptolite stems, Elythra, Leptochelone, Gray very fine grained ls.

H. About  $1\frac{1}{2}'$  -  $2'$  gray fine grained limestone with thick chert nodules, large crinoid stems.

I - Covered no rock seen in 8' above last exposure.

J. At top of 8' comes weathered sandstone and chert of alt type.

The segment of the creek that swings east over the highway flows south close to highway and then swings to west. This portion of creek has excellent exposures of shale and some loose blocks of the oolitic and sandy Tringle with corals and *Centronella*, *Orthis*, *Tropidoleptus*.

Aug 8'

Branch of Cooper Creek SW  $\frac{1}{4}$  NW  $\frac{1}{4}$  35-135-24W. One loose block here contained *Antrocoelia*. This is like blocks above *Centronella* bed. *Antrocoelia* was seen above *Centronella* bed in the exposure to the north.

In the shale on this creek several exotic blocks were seen, and where the Dutch Creek appears the rock suggests a fault breccia



64/95  
51

26/95  
3



1955

10

as it contains fragments of the Springfield light green shale, Mtn. Glen shale and other exotic pieces. The Dutch Creek appears about 100 yds. upstream from bridge at intersection.

In the Missouhian here, occurs a bed of leached lime ss. containing a few small corals, small *Chonetes*, *Orthis* and *Sp. nummatus*. This is clearly a bed in place and suggests our *Missouhian* bed.

August 10.

Position of Michigan

Top

41' I.

33' H

6' G.

2' F

10' E

6' D

35' C

5' 11" B

5' A

16' 6" A.

Section at Bakerover ridge. Section begins on ridge where it butts into water at west side. Strike about 20' above base  $N 51^{\circ} W 24^{\circ} E$ . Highwater is 10 feet above standard. Magnetic =  $N 46^{\circ} W$  true N.

A- is a considerable thickness lumped together. The bed contains a fairly thick chert as at the top which varies from 3-5'. The top of the ss is irregular and contains some carbon. The lower part 10' + has some sand but is mostly granular moderately crinoidal limestone when weathered but hard and marble-like when fresh. It strongly resembles the bed at Mountain Glen. W. Spring the fine the ss. thickness is about the thickness of the upper bed is about 7' thick. I saw few identifiable fossils but the presence of the large macrothyrus type of *Spingia* like those in the Grand Tower at Mountain Glen is good guidance of that formation at least. Large *Leptaena* and *Rhipidomella* were also seen but the characteristic corals of the Dutch Creek were not detected.



①

2880

B. Irregular, wavy layers of limestone separated by thin partings of argill. incl. thin of coarse sandstone. This is the upper limit of the coarse sandstone and is at the base of the Bakoven near water level.

✓ C - 35' of light yellow to brownish gray moderately coarsely crystalline limestone no fossils seen

D - Covered interval of 4'

E - 10' dark brownish gray limestone in 6"-9" beds. Fossils few. Proetus.

F - 2' covered.

G - 6' dark brownish gray limestone with *Camarotoechia*. A distinct lithological change occurs at C-E. *Atrypa*

H - 33' of same type of rock but with few fossils.

I - Is fossiliferous part of section. Above bottom of I occurs a zone with abundant *Rhipidomella*.

25' above base of I comes a one-2' foot bed crowded with *Chonetes* of medium size and containing also a large *Pandeyella*. This bed is quite shaly and has a very rough surface showing the sections of *Chonetes*. The upper 15' has abundance of *Pholidostrophia* and the topmost 2 feet of the section abounds in yellow chert.

~~Fossils from E-H.~~

17  
16

52



(12)

1887

Microcyclus was not seen in the section at the Bakeoven but south about 150 yards at a gap in the north end of the Backbone sequence. Microcyclus occurs with other corals and Schizophoria at the edge of the quarried part of the backbone. It is likely, therefore, that Microcyclus occurs in the Schizophoria bed of my section of 1936. In the south quarry face at this point the Chonetes zone 25' above base of I occurs and is very conspicuous. Microcyclus occurs with Schizophoria, and Leptæna 27' above the Chonetes bed. The Microcyclus bed with its Schizophoria may = my Schizophoria-Leptæna beds of the 1936 section. The Microcyclus bed is at least 5' thick and forms the highest beds of the dip slope on the north end of the backbone. The place where this all can be seen is south of the fine house at the Bakeoven. Go through the gate at the garage, past the barn to the gap between the high and low parts of the ridge 257 paces in all 645' in all.

At the Bakeoven the Chonetes zone is located about 5' above the easternmost long dip slope near the middle of the exposed rock.

The zone of abundant yellow chert appearing at the top of the exposed section this year occurs about 10' below the Microcyclus zone in the quarry face.



(13)

1958

2863

Fossils from E through H to the base of the Chonetes bed are hard to get. Below low down *Atrypa*, *Microspira*?, *Camerozoechia*. Higher came *Lepidodonta*, *Rhipidomella*, *Schizophoria*. Small *Chonetes* occur every where. Large cephalopods rare.

With the *Chonetes* zone comes large *Paracyclas*, a large *Chonetes*, *Pholidostrophia*? and these continue into the *Microcyclus* zone.

In picture 3 *Chonetes* zone is just under big block under small tree at base of massive ledge.

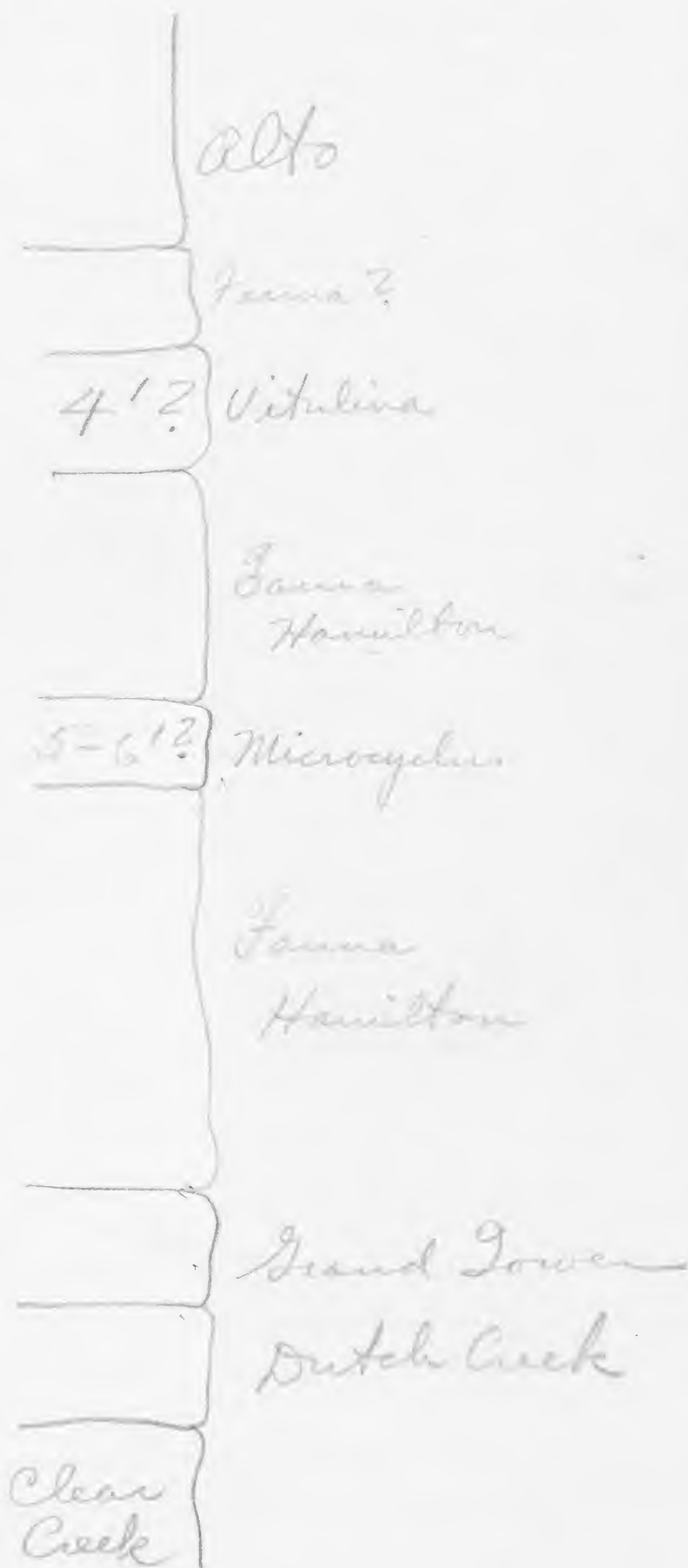
Aug 10'

Aug 10' 0.2 mi. S of RR station and 75 yds east of road. 15' band granular brownish gray ls. with few fossils. *Crinoid* stems, *Camerozoechia*, *Atrypa*, *Spinea*. I think this belongs at base of Hamilton just above Grand Tower thin band of chert 5' below top. on SW face of Walker Hill.

After reading Savage's section it is possible to match this with ours very well. Beds 556s and 556t and our *Chonetes* zone.

Beds 556a + 556b = sandy Grand Tower or Dutch Creek. Beds 556c - 556h = my bed C. 556i - 56n = E to *Chonetes* zone of I. 556u - y = beds to nearly the *Microcyclus* zone. Savage takes his change to the Hamilton where more shaly beds appear. The *Microcyclus* zone is not always more shaly but, as on N.W. 36N, is a hard/dense argillaceous limestone.

# Hypothetical section



24  
3  
121



(14)

1959

2803

As we see the Trile now the beds above the crystalline light marble-like limestone of the Grand Tower are Hamilton. These show a striking change at the Baker Oven. The lower 51 feet of that section are crystalline and light colored but the beds above are less massive, when weathered and of varying degrees of brownish gray. They usually are bituminous and small somewhat oily when fractured. Possibly the

Aug. 11

Dart Creek revisited

alto float

G

22' above stream level at tumbled blocks appears a ledge in bank probably representing position of tumbled blocks.

1 1/2'

F

5 1/2'

E<sup>2</sup>

1 1/2'

E'

About 40' above stream level appears a 2' ledge of x-line limestone (D) containing *Vitulina* and *Tridoleptus*.

7 1/2'

E

2 1/2' x line ls.

D

E is covered but E' is a foot and 1/2 of hard bluish limestone possibly an *Alto* but possibly float from F. It contains *Sp. mucronatus*.

Covered

14'

C

E<sup>2</sup> is covered but F is 1-1/2' of hard limestone like E' with small corals and a few other Hamilton fossils. Above G. the float is of *Alto* type.

3' Cherty ls.

B

22'

Covered

A

D- is 2' 9" with the white forming the lower nine inches

*Trile*

38

39  
25  
17

*Trile*

base of *Alto* 137' above Dart Creek. *Vitulina* 16' below *Alto* in *Alto* 121' above Dart Creek. + *Trile* in *Alto* 121' above Dart Creek.



The Vitulina are most abundant in the lower 2'. I did not see them in the oolite. The large pieces showing oolite ~~showing the oolite~~ have this bed on the top, but where the rock is in place no oolite shows suggesting the possibility that it is under the big blocks. It is not however so much eroded as the Vitulina bed which indicates it should be at the top.

Scotty excavated and showed oolite under the blocks with Vitulina. The section of D is thus

fine grained Vitulina	2'
coarse granular ls without Vit. 6" ±	
oolite	9"

The oolite bed is thus the reverse of the situation at Fingle Creek where the oolite comes just above Vitulina, Centronella and Dropidoliptus. We may thus be dealing with two Vitulina beds separated by oolite.

Grand Tower locality revisited. A definite lithologic distinction can be detected between the upper beds and the lower ones with Amphigenia and big Spinfers. The latter are more massive and weather on their sides to a different pattern. The lower beds are light colored, bluish gray and weather with a strong fluting. The upper beds are weathered with more closely spaced fluting and have a more shaly fracture when weathered. The upper beds are brownish gray and fundamentally different from the lower ones. As there is a 6-8° dip



$$\begin{array}{r} 8.5 \\ 25 \overline{) 216} \\ \underline{200} \\ 16 \\ 15 \end{array}$$

$$2.5 \overline{) 8.5} \quad (3.4)$$

$$\begin{array}{r} 3.4 \\ 2.5 \overline{) 8.5} \\ \underline{7.5} \\ 1.0 \end{array}$$

$$\begin{array}{r} 586 \\ 478 \\ \hline 108 \\ 2 \\ \hline 216 \\ 97 \\ \hline 270' \\ .225 \\ \hline 1350 \\ 540 \\ 540 \\ \hline 60750 \end{array}$$



$$\tan 13^\circ = \frac{30}{C}$$

$$\tan 13^\circ = \frac{30}{C}$$

$$C = \frac{30}{\tan 13}$$

$$.2309 \overline{) 521.07} \\ \underline{521.07} \\ 0$$

$$\begin{array}{l} C = A - 130 \\ \tan A = \frac{30}{C} \\ C = \frac{30}{\tan A} \\ 130 \end{array}$$

(16)

2861

The *Amphigenia* beds dip under the road at about the middle of the exposure. There are about 18' of them at the SE end of the cut. In the middle of the cut there are about 12' of lower ls. The brown ls fauna is 14' different from the lower one and contains *Pentamerella*, *Atrypa*, *Meristelloid*, etc. A thin zone abounding in a small *Centronella* occurs about a foot - 1 1/2' below the top of the *Amphigenia* zone.

### Mountain Glen.

Mt. Glen

82' Alto

Alto beautifully exposed in Clear Creek, dipping 13°. Contains *Fenestrellites* and *Glossites*. Base of Alto is a cherty layer but resting directly on bed of Hamilton, a bed 1 1/2' thick containing *Tropidoleptus*. The Hamilton top appears in the hillside about 30' above the stream 225' west of the top of the Alto.

1 1/2' Hamilton

15' covered

5' Fossils or lites

5' covered

10' Calcareous shale

10' Hard shaly ls. cherty

30' covered

5' shaly ls

10' covered

5' Meristelloid

10' covered

10' granular Crystine

At 315 feet above Alto appears a thick ledge of Hamilton, probably in place and about 4' thick. The lowest foot or more is oolitic, the upper 3' contains *Tropidoleptus*, and *Vitulina* in a light gray argillaceous limestone about 1/2' above the oolite. In the interval above the *Vitulina* bed occurs yellow shaly ls. and cherty shaly limestone with sp. numerous and *Strophodontia*.

at 452 paces is a small gully showing 10' - 15' of little calcareous shale, weathering yellow



$$\begin{array}{r} 74 \\ \hline 198 \\ \hline 37 \\ \hline 185 \end{array}$$

(17)

1962

At 478 a small ledge shows 15' of hard shaly sandstone dipping steeply. The lower bed contains *Striatopora*.

At 548 the base of the shales is about 30' up on the slope and under them comes shaly ls. about 5' thick.

At 586 come 5' hard limestone with *Microcyclus* and many small corals in place at bend of stream where latter undercuts bluff.

At 600 comes a 10' ledge of granular limestone containing abundance of *Cyrtina* in its upper part. This is same as bed under *Microcyclus* at Green Creek. Bridge (old) comes at 610 paces.

50 paces from old highway bridge to new one. At 233 paces above old bridge at bend in stream occurs *Atrypa* zone of lower Hamilton which is exposed on the highway about 0.1 mile west of new bridge. 10 paces upstream and below the *Atrypa* bed comes Onondaga with large *Spirifers*.

Pictures -

- 1 - Dutch Creek on New Alto Pass road.
- 2 - Back view from N.
- 3 - Quarry in Backbone.
- 4, 5, 6 - Grand Tower on New Alto Pass road.
- 7 - *Microcyclus* zone south of Ridge School.



94

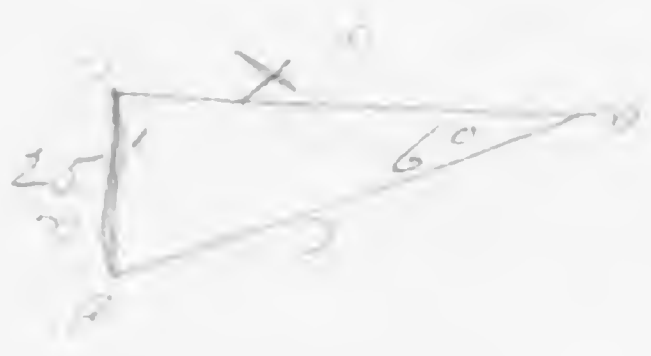


$$\begin{array}{r} 5 \\ 0.14 \\ \hline 0.694 \\ 52 \end{array} \quad (5701)$$

$$52 = 1.5 + 0.1$$

$$5701 = \frac{x}{25}$$

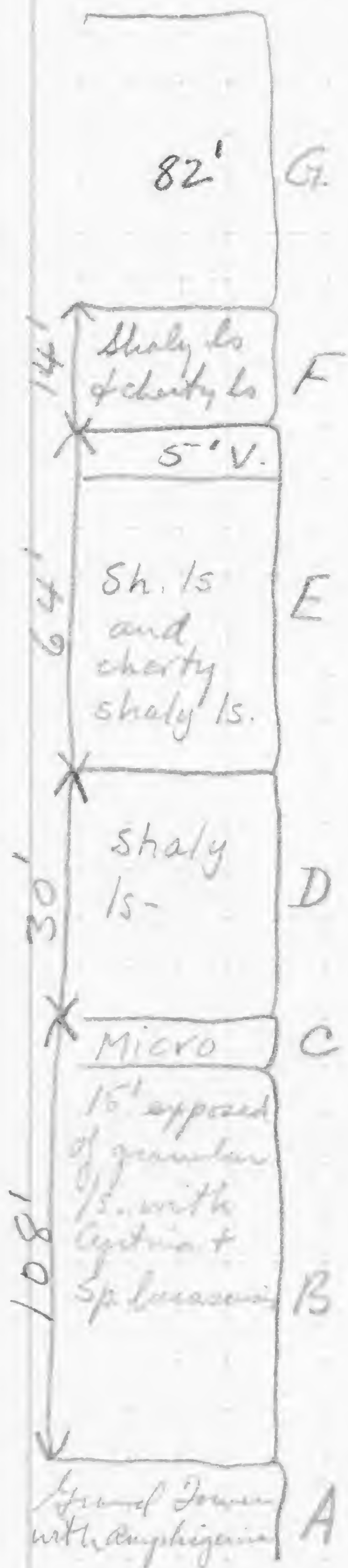
$$57 = \frac{x}{52}$$



(18)

803

Results of traverse of Clear  
Creek by A.S. Reinhart



A- Grand Tower

B- Hamilton to top  
of Microcyclus

C. Microcyclus zone

D- Microcyclus zone to  
top of shaly ls.

E- top of shaly zone  
to top of Vitulina

F- Vitulina to base  
of Alto-cherty ls +  
shaly limestone

G. Alto = 82'

The section on  
page 16 should be  
adjusted to the  
thicknesses given here

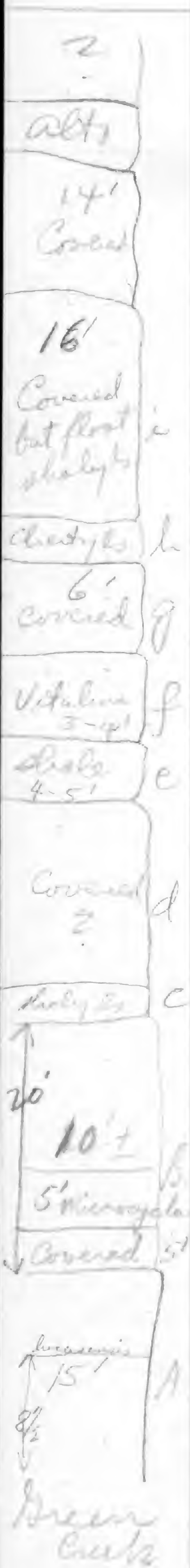
108  
31  
87



(19)

1964

August 12, 1964



Went to isolated area north of Hy. 146 and forming edge of bluff. Walked thru a pines and saw Clear Creek and Dutch Creek float. About 0.1 mile north of bridge much Dutch Creek and Clear Creek float in a deep ravine. About 0.1 mile south of this ravine basal Hamilton was seen in the woods. Behind the house in a ravine Hamilton chert was present. We abandoned this place because of the poor character of the outcrops.

Green Creek reassessed. At bend of creek about 15' of hard limestone with a band of *Cyrtina* beads about 6' above bed of creek. 2 1/2 feet above the *Cyrtina* comes a thin streak with *Sp. leasensis*.

B- Covered with 2' ± at top of shaly (C) ls. with *Tropidoleptus*, *Sp. numeratus* and small *Chonetes*.

D. covered mostly. On slope east of exposures in creek loose blocks of *Vitulina* limestone can be seen. These are nearly in place above a few feet of yellowish shale in a small gulf just south of the road and 250' east of the bridge over Green Creek in a recentant just S of Hy 146. Above the *Vitulina* which showed the oolite at the base, come covered 6', the 2' of cherty ls. with thick beds of chert. Next the rock is mostly covered but plates of shale nodular limestone with the nodules



1965

1965

(20)

hard and fine contained Hamilton fossils: *Schuchertella*, *Platystrophia*, *Elythra*. These fossils were collected for 16' above the Vindicator. 14' above the last fossils is a thin ledge of *Alto*. This section thus proves to be similar to that at Darity, Mtn. Glen & Tingle Creek. Late afternoon packed two boxes and made ready to move over to Missouri.

Aug. 13.

76-Creek

Section started at a thick ledge of limestone about 15' above creek level. This ledge is about 10' thick and consists of light brownish gray hard limestone breaking into thick lumps. Fossils not seen.

1. 251 <sup>paces</sup> further downstream is a ledge of the same limestone  $N 45^{\circ} W 56^{\circ} NE$   
33
3. 81 paces same type of limestone without fossils. Dip is ~~49~~  $49^{\circ}$  and strike  $N 45^{\circ} W$ . About 8' of rock exposed  
32
4. 136 paces - jumbled mass of rock somewhat crystalline and having the appearance of being deformed. Dip low compared to 12 exposures upstream,  $25^{\circ} NE$ , strike  $N 35^{\circ} W$ . Large *Paracyclas* and possibly *A. spinosa*.
6. 172 paces - 189 paces low outcrops in stream of granular limestone to fine grained light brownish gray with coarse ribbed *Productella* like those at base of Hamilton on Green Creek in elliptical. Other fossils *Pholidostrophia*, *Droptrochonta*.  $N 52^{\circ} W 6^{\circ}$ .

Numbers refer to weathering stations but outcrops are consecutive.



700'

452

127  
2  
254  
517

300

(2)

1800

8 - 149 paces. Light brown fine grained limestone with *Chonetes*, *Ep. lucasensis*, *Pholidostrophia*.  
N 44° W 28° NE. 6 is probably top of slumped block. Fossils taken from about 8' of rock.

161 paces a similar exposure about 5' thick.

9 - 180 large exposure of fully 20-25' of rock making nearly continuous exposure with 18. Lower two feet contains *Ep. lucasensis* and a *Chonetes* in abundance. Contains considerable dirt.

10 - 216 paces about 10' of rock abounding in *Chonetes* and *Laptania*.  
N 58° W

11 - 228 paces - Continuation with 11 is *Microcyclus* zone exposing about 10' of rock containing *Microcyclus*, small corals, *Helizopteria* common.  
N 48° W

12 - 266 paces. About 8' brownish gray limestone with small *Chonetes*, small *Spirifer*, small *Atrypa* and a large smooth brachiopod.

To 631 paces covered. Then comes granular coral limestone. Beds go up 10' in bank?

At 746 come hard blue limestone  
at 826 came the school.

1053 paces up the road along the creek is a small ravine on the NE side showing 20' + of rock above 15' covered, 25' if all. Near base of section *Atrypa* *Sp. sp.* occurs and probably corresponds to *A. sp.* at 4.

95

876

246

1053

1053

over



*Microgryllus* bed occurs opposite  
a point on the road 250 paces  
southeast of the house

(22)

1967

August 14

Composite section in two small  
gullies just SW of main creek at point  
about 350 paces south of school.  
Waitin station 31.

10-12' D.

7'

C.

16

B.

22'

A.

A - 22' of heavy bedded fractured  
ls. with few fossils but with  
upper 4" thinly laminated and  
containing a peculiar *Rensselaeria*-  
like brachiopod. This is the same  
shell as at sta. 12 of Aug. 13.

B - 16' covered.

C - 7' fine grained light gray limestone  
laminated below but with one  
crinoidal streak near the middle

D - 10'-12' crinoidal limestone  
with many corals as at school

E covered 15'-20'

F a few blocks of crinoidal and  
limestone with a block of yellow  
limestone abounding in *Cladopora*

350  
200  
150  
115  
35  
29

200 paces up mainstream from  
its intersection is a mass of rock  
lying in stream and on banks dipping  
38° ~~and at~~ SW and striking N 50 W.  
The chonetes zone is present and 10-15'  
above it comes *Microcyclus*. 20' above  
*Microcyclus* is a zone of abundant  
small *Athyris*. The *Athyris* zone is at  
225 paces south of intersection.



(23)

1968  
1803



73 paces north from top of over beds  
comes Microcyclus again N25°W 50°NE  
Between 60 feet above Microcyclus  
some peculiar branching of Stal 12  
of yesterday. It is 97 paces to first  
Microcyclus from stream intersection.

12 1/2 K

2 T

10' H

112' G

3' F

11' E

16' D

40' C

atypic  
16' B

15' A

Section on road S. of Ridge Rd.

A - Microcyclus zone - Shaly limestone  
with upper part becoming thicker  
bedded and with much yellow clay  
N75°E 35°W 35°NE. Microcyclus is restricted  
to about the lower 6'.

B. Heavy bedded limestone with  
abundant small atypias at top (upper 15')

C. Mostly heavy bedded limestone  
and shaly ls. partings. Heavy  
beds at bottom. Mostly covered  
to upper 8" which is laminated  
yellow ls.

D. - Mostly covered but upper  
2' consists of hard fine-grained  
ls. with *Chonetes cordatus*  
abundant.

E. - 11' covered.

F. - 3' of very hard granular  
limestone abundant in  
*Chonetes cordatus* and  
Cyathophylloid corals in upper  
foot.

about 10' above F comes a loose  
block with many small *Chonetes*.

(24)

1969

1800

G. is a covered interval.

H. - is 3 ledges of cherty ls.  
looking like Alts but with  
Chonetes. probably 10'.

I. - is a short covered interval

K. - is 6" ls. at base then 10' + shale  
with abundant small Chonetes  
overlain by 2' limestone with  
abundant Chonetes.

L. - covered

M. - shale much weathered

N. - covered

O. - is 6' light brownish gray  
cherty ls. with sp. much smaller than  
Strophodonts. A few more feet  
probably present because free fossils  
occur in float for several feet  
above outcrop

Tropidoleptus occurs just under  
the first Chonetes corvatus.



1970

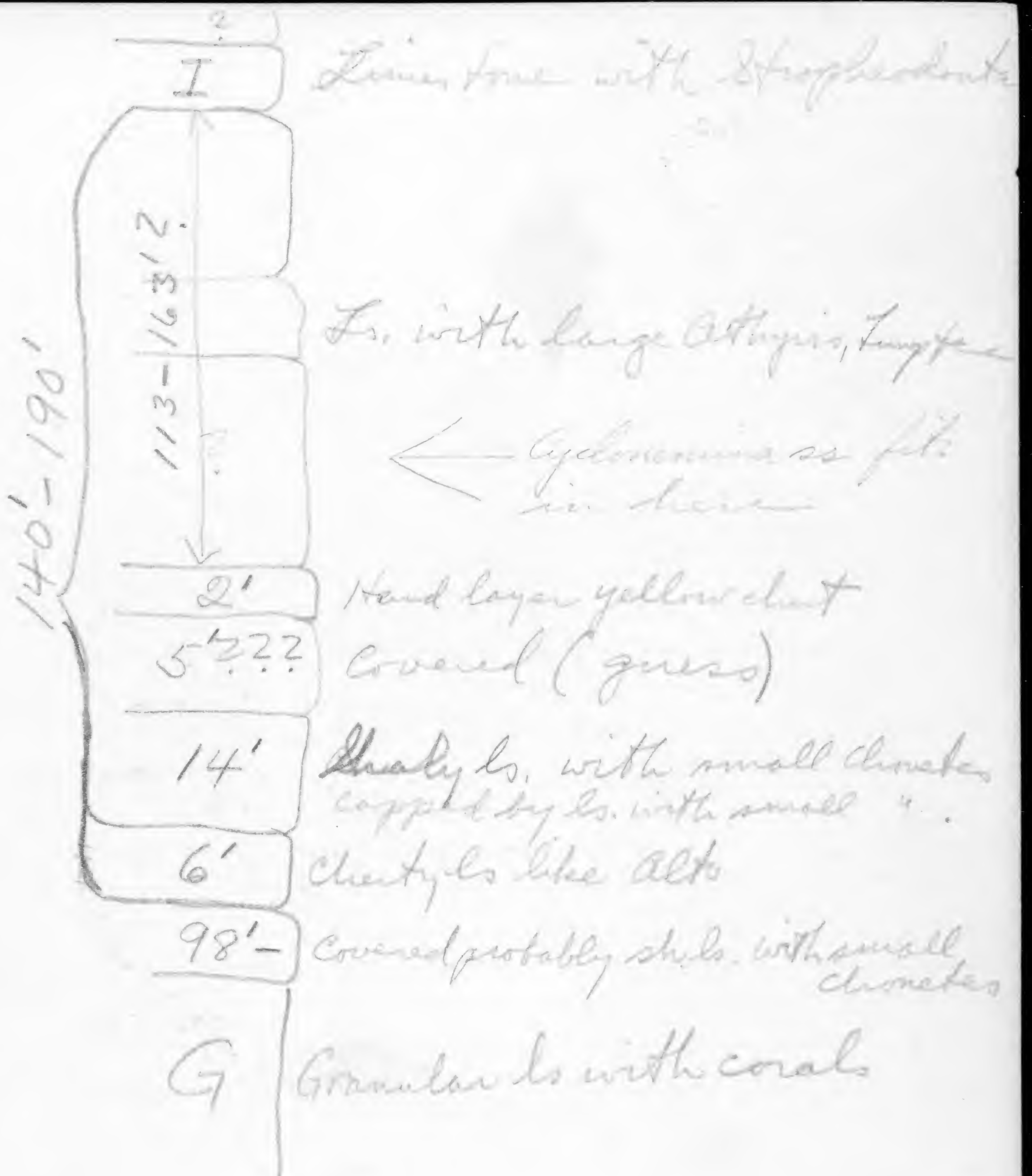
(25)

2480

Generalized section  
~~Wittenburg~~ - Ridge School - Union  
 School

over for section of 14

6'	I	Hard ls. with <i>Strophodontia</i>
146+ 190' 98=238' 288'	H	Shaky ls with cherty ls. ledges all containing abundance of small <i>Chonetes</i> . Full thickness not obtainable
10'-25'	G.	Granular ls with corals
30'±	F	Limestone with <i>Dipidoleptus</i> <i>C. coronatus</i> and
40-50'	E	Limestone with "Newberia" at top.
16-20'	d	Limestone with small <i>Athyris</i>
5'-6'	c.	Limestone, cherty with <i>Microz</i> clus
77'	B.	Limestone with <i>Sp. acumin</i>
5'	A-	Heavy bedded ls. with <i>A. spinosa</i>





August 17

1971

Study of hill southwest of Ozona Hill with quarry

On NE slope of hill a zone of digitate Favosites was seen in the St. Laurent 82' below the top of the hill.

In morning went over hill at quarry. Late afternoon collected from Grand Tower west and north of the Boardman School. At base strike is  $N14^{\circ}E 6^{\circ}E$

A. The lowest 5' is in hard limestone abounding in crinoid debris, some elongate thin corals, scattered light yellow chert, occasional Favosite heads, and a few brachiopods. Fish fragments and large Paracyclops occur. A 2' interval is light brownish gray, crystalline in lower part but without the corals and thinner bedded towards the top.

A<sup>3</sup> Third 5' consists of rock similar to before but becoming more massive above and with scattered big cephalopods. The upper layers have a very irregular surface and are in beds up to 6" thick. Large Strophodonts, small corals, and other sponges were seen.

B. - The next 25' are composed of brownish gray fairly hard rock breaking into lumps and having a distinct bituminous odor when

25' B

16' A

freshly broken. All but the bottom foot of this bed abounds in the brachiopod *Schizophoria*, occasional *Favosites*, small elongate, narrow corals.

August 18.

Section on St. Laurent Creek, 3 miles SSE of St. Marys.

Section run by tape and taken vertical to strike. Strike on second sandstone layer N 72° W. dip nearly vertical.

A = total of 42'

A' - An 2' bed massive sandstone showing little bedding. Texture about that of granulated sugar.

A<sup>2</sup> - 15' - Thin bedded light colored limestone containing sand grains.

A<sup>3</sup> - Crossbedded calcareous sandstone 19'

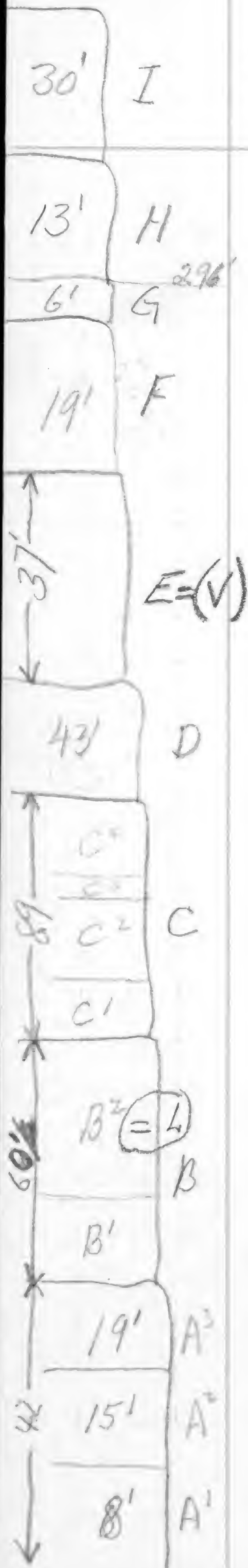
B - ~~68 1/2~~ 60'

B' - basal bed of about 8' very fine-grained calcareous ss. Then a covered interval of 18'.

B<sup>2</sup> The remainder is thin-bedded shaly breaking limestone to the base of a heavy ledge on which a tree is growing. Fossils become abundant in this interval.



296  
936



B<sup>2</sup> - 10' below top of this interval  
 Sp. and aculeus is very abundant and  
 7' below B. and aculeus a large mass  
 Chonetes is common. N 65° W 73° N

C - 89'

C<sup>1</sup> - Lower 25' contains  
 scattered fossils with Sp. mucronatus  
 a small Camerotoechia, small  
 Chonetes. The rock is heavier  
 bedded than below, impure  
 brownish gray, fine-grained  
 limestone. in thick beds forming  
 the bank at a meander of the  
 stream.

C<sup>2</sup> - About 25' of impure  
 limestone in thick beds crossing  
 the stream and making a small  
 fall. Fossils not seen.

C<sup>3</sup> - 8' of hard calcareous ss.  
 The upper layer is <sup>calc.</sup> ss with fine  
 quartzitic ss standing out and  
 appearing like quartz.

C<sup>4</sup> - 30' 7' hard gray limestone  
 with quartzitic chert. Cystodictya,  
 Atrypa, Pliocops, small Chonetes.

D - 43' covered.

E - 37' Heavy bedded limestone  
 Brownish gray in color containing  
 many fossils: Cystina, Sp.  
 mucronatus, Cystiphyllum (10' below  
 top) Diplura. N 85° W vertical



F - 19' covered 28' 2

G - 6' - lower massive ledge of grayish brown limestone containing small *Strophodonta*, small *Strophodonta* and sp. *uniconatus*. The upper 18" is a limestone conglomerate (perhaps intraformational), *C. coronatus* d.

H. 13' black fissile shale with brown streak.

I - 30' covered to next limestone a white marble-like limestone with thick lenses of chert. 65' horizontally downstream from I comes granular limestone with *Bellerophon* and *Rhynchonella* *dupia*. The strike here  $N 85^{\circ} E$  and with a steep  $N$  dip.

The upper part of G contains *C. coronatus* in abundance.

*Coronatus* ranges through the whole thickness of E and almost to the top of G. The total range thus is about 60'.

1101



(30)

1925

Aug. 17-18-19

Section in glen south-southeast  
of Ridge School.

In these gullies the  
presence of *P. flabellum*  
suggests all is below Liddville

Handlevelling begun near head  
of glen, rock exposed 55' from  
top of divide between gullies.  
Consists of rotten limestone with  
*Strophodontia gemma*, *Sp. mucronatus*  
and seems to be same rock as  
exposed at top of gully seen on  
Aug. 14. Top bed  $N 20^{\circ} E 7\frac{1}{2}^{\circ} SE$

95' to layer of chert. Next 15' comes  
shale with *Chonetes* to road which is  
at 445'. Thus the chert bed is at about  
455' and the top bed is at about 495'  
Chert bed strike E-W  $19^{\circ} N$

Aug. 19

Reconnaissance of stream from road  
corner NW. Downstream to house on  
top of hill to west of stream are  
occasional exposures of the shale  
of the St. Laurent which is a leached  
argillaceous limestone. The thick  
chert bed was seen and also the  
*Athyris* zone which also contained  
a large *Limostrea*.

South of the road corner and  
about 100 yds upstream is a  
good-sized exposure of shales  
and one leached hard sandy, long  
band abounding in *Sp. undulatus*,  
*Leptostrophus*, small *Chonetes* and  
in a thin layer lower down *C. coronatus*.

Beside the old abandoned road south occurs a small glen. 14' above a lot of yellow chert in the stream bed, which I think may be the same chert that occurs 15' above the road south of the Ridge School, occurring blocks of sandstone for 10'. It is brown, case hardened, white to brown, sugary ss. when fractured. It contained small *Strophodonts* and *Cyclonema* in abundance.

40' above the ss are loose blocks of light yellow gray fine grained ls. with scattered crinoid debris. *Othyris* only fossil seen besides crinoids.

From the top of the ls to the road is 40'. The ss bed is thus 80' below road level. The ls marks about the top of the Hamilton at this place. The ss occurs at 570'.



5-20  
1-

458

32

1977

A19<sup>2</sup> - Wittenberg - hillslope on  
west edge of Wittenberg

?

---

8'± B

---

3± A

---

?

A - About 3' of fine grained, granular  
brownish gray limestone abounding  
in *Tropidoleptus*, also *Leptostrophid*  
*Rhipidomella*

B. 8'± with about 1 1/2' oolite in  
basal part and light gray granular  
limestone above all packed with  
a variety of corals. At top foot  
corals are not abundant and  
yellow chert appears in the top  
3'.



(33)

1978

August 20 <sup>to west</sup>  
Reconnaissance from road  $1\frac{1}{2}$  miles  
northwest of Ridge School over to 75-Creek  
across divide to Aug. 19 Creek and  
back to Ridge school Road.

A20 - first rock encountered is  
hard brownish gray limestone  
containing *Sp. lucasensis*, exposed in  
bed of road 15' above first crossing  
of stream and road over divide.  
Stream crossing to N side road.

80 paces downstream is an  
exposure with *Sp. lucasensis*? dipping  
25° N 70° W and striking N 20° E.

145 paces limestone with small  
clonates striking N 10° E with low  
dip east

225 <sup>paces</sup> came a fault breccia. At  
340 stream and road cross.  
stream on SW side. Fault breccia  
20 paces downstream from this  
intersection.

At 575 a glen on NW side of road  
with loose blocks for 20' vertical  
with small clonates, large *Paracyclops*  
and *Schizophoria*.

At 700 paces comes cut in hill  
and stream road crossing. Stream  
to NE. Rock in cut contains a.  
*spinosa*. 844 stream road cross  
stream to SW. At 1000 paces  
comes tributary glen from SE.

4500  
645  
3125

1000

1250  
2  
2500  
625  
3125





(34)

1973

290 paces up glen we saw *Sp. lucumina* in the limestone. Coral bed occurs in "Starland" Creek  $S 30^{\circ} E$  of house on hill.

① 500 paces upstream from coral bed occurs a layer of shale with two thin limestone bands  $N 37^{\circ} E 11^{\circ} SE$ . About 34' of shale exposed. In the limy ledge 20' above base occurs: *Athyris*, big. cephs. *Strophodonts*, *Lunoptera*, *Homotoma* a regular *Delphinid* fauna.

② 600 paces comes another exposure  $N 33^{\circ} W 30^{\circ} NE$ . heavy bedded shaly limestone much leached with yellow rotten chert of which a thick 1' plus layer forms the base with about 15' above it. *Sp. mucronatus* is abundant in the chert.

③ 655' - 15'  $N 54^{\circ} W 31^{\circ} N$  rotten cherty limestone abounding in small *Chonetes*. This suggests the Alto-like limestone above the coral bed. These beds above the coral bed may represent the "Delphi facies" of the Alto. 10' chert under 40' under bottom  
1250 paces to bend in road where we started.

④ 100 paces upstream from bend in road  $N 45^{\circ} W 36^{\circ} NE$  shale containing heavy limy layer

682  
1310  
1310  
1310



near bottom and limy layer near top. Sequence from bottom shale 3' ls. 1", shaly with thin ls 10'. Limestone q. The one foot ls contains *L. perrana*, *Sp. andaculus*, small *Crinoids*. Saw *C. coronatus* here yesterday.

In the small glens west of the road down to the creek the *Cyclonemina* ss. occurs resting on 3' of silty, leached limestone.  $N40^{\circ}W$  dip NE.

The ss is about 4-5' thick with the bottom bed about 1 1/2' thick brown fine grained ss. with few fossils. The next layer is about 1' thick or 9" thick with many fossils. The next bed is brownish ss about 1' thick on which rests blue clay. The top ss bed contains many *Cyclonemina* & *Sphaerodonta*.

Some distance above Hamilton east of road leading S of Ridge School black shales occur under a few feet of limestone (Mississippian). On the ls. is a green clay, then a covered interval followed by Mississippian limestone. We saw no trace of the *Cyclonemina* sandstone.

The sandstone with *Cyclonemina* at the top of the Hamilton was followed from the Ridge road turn-off down to the creek for about 0.2 mile along the slope. It occurs in most of the little



gullies west of the road to the creek. In the farthest west gully possibly 0.1 mile west of house on ridge the ss had descended nearly to the bottom of the glen and we saw little likelihood of picking it up farther to the west. This sandstone may form the top of the Hamilton. Above it was blue clay but most of the 40' between it and a limestone on the slope was covered and the interval may be shale. Although the upper ls. contained an *Atthyrid*, the fact that it is unleached may indicate it to be Mississippian. Above the limestone are 15-20' of yellow weathering dull white chert with a fossil suggesting *Petrarchia laevis*. I think this chert is Mississippian.

In the glen just east of ridge school, middle fork, above the Hamilton on the slope of the glen came a foot or two of black shale, glauconitic limestone (thickness not determinable) with a few fossils. Then a greenish shale interval and Mississippian limestone after a covered interval above the green shale. The limestone might possibly be Louisiana?



(37)

1882

1982

August 21

6 1/2 miles to  
Little Saline  
Valley N of Independence  
Ark.

A21- Tossed blocks of limestone and ss along old road showing presence of *H. Laurent*. One block contained *Pseudophyllum* and abundant corals including many *Cladopora*. ss. blocks abound for *C. carinatus*, *P. carinatus* and *Strophodonta demissa*.

Went to locality 1 1/2 miles west of Lithium but failed to find any fossils.

August 22 Lone Star School

A-A' are exposed just downstream from ford

A - Thick ledge of hard smooth gray limestone containing small cavities filled with calcite. No fossils seen. A' - 4' dolomite irregularly bedded ls. with Silurian fossils at base edge.

B - covered in lower 3' but upper 2 1/2' composed of earthy gray shaly fracturing limestone containing fossils.

*Pentamerella*, wide-hinged *Spinifer*. Small *Atrypa*. Contains also scattered yellowish chert. Total about 15'.

C - More solid ledge of yellowish gray limestone containing corals, *Calymene*, *Atrypa*, *Platystrophia*.

Silurian.





D- 5 feet of yellowish granular crinoidal limestone, the crinoidal debris well scattered, containing corals, *Pholidostrophia*

E.  $1\frac{1}{2}$ - $2\frac{1}{2}$  of calcareous ss. when fresh but fine grained. between granular ~~ss~~ sugar and table salt in texture. Abounds in fossils. This ledge is as much as  $2\frac{1}{2}$ ' thick. Big *Schizophoria*, big *Atypa*.

F-3-6' ? or 3' green soft shale  
See below

G. Louisiana ls. (not measured)

Just west of the house bed E of the Devonian forms a water falls. 67 paces upstream from this falls comes the lithographic Louisiana limestone in the stream bed and opposite the house. I guess there is only about 3' of shale ? between the ss and the Louisiana

A and A' exposed downstream from ford and top of A. for about 50-75 yds above ford. Section taken in bank about ~~75~~ 75 yds above ford.

(39)

1984

1884

Sandstone is 25' above stream level about 95 yds above ford but is in stream 60 yards below house

ASW thinks the green shale F is the same as that seen just below (SE of Ridge of shore above the limestone of think was Glen Park or Louisiana.

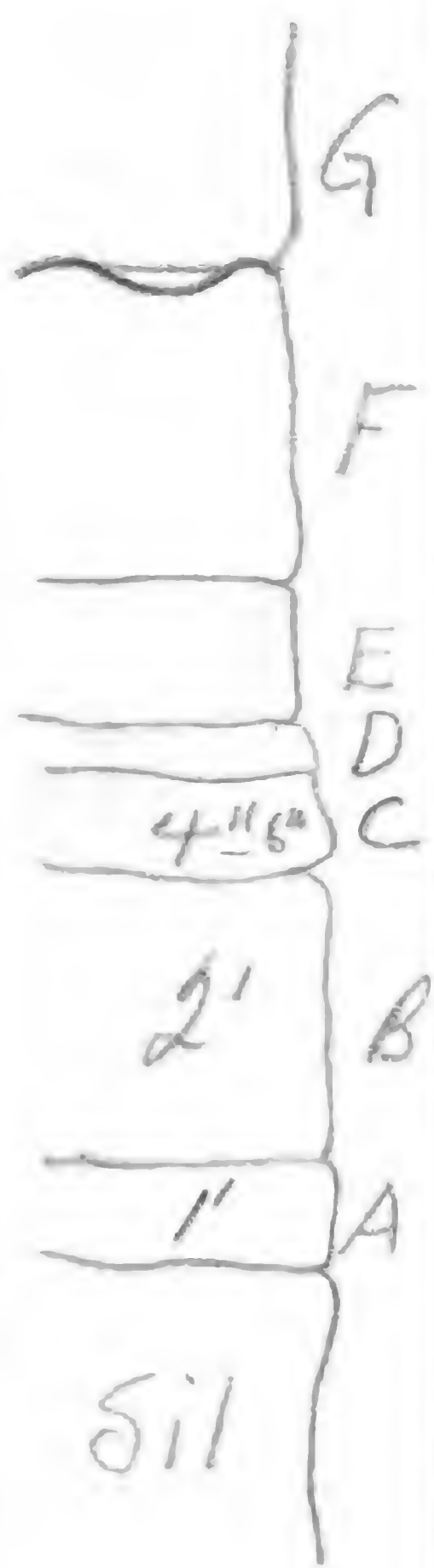
August 23

Section behind ME Church in Hamburg, Illinois

A- 10"-1' of sugary brown ss. with small cup corals. Prismaephyllum,

B- 2' brownish thick-bedded shaly fracturing limestone containing scattered corals, large Strophodonts, large wide linged Spiner, digitate Favosites, moderate sized corals. This bed suggests the upper 5' of the Iowa str. section below the ss.

C- 4"-6" of hard limestone granular, brown to yellow-gray. Contains cup corals.





(40)

1983

D- 2" sandstone veneer on C marked with *Taonurus* or *Spirophyton* and other worm tubes.



The tubes filled with green shale of the overlying bed. This ss. contains chitinoidea debris, cup corals, *Atrypa*, large *Spirifer*, coarse-ribbed *Atrypa*. Sandstone fine-grained, yellowish brown, limy.

E- 1' green fissile shale

F- 3' + lithographic Louisiana ls much channelled limestone with *Schuchertella* whitei.

G- Thinly laminated cross-bedded = ls. Hannibal? or probably upper Louisiana

A23' = NW 1/4 SW 1/4 18-105-2W

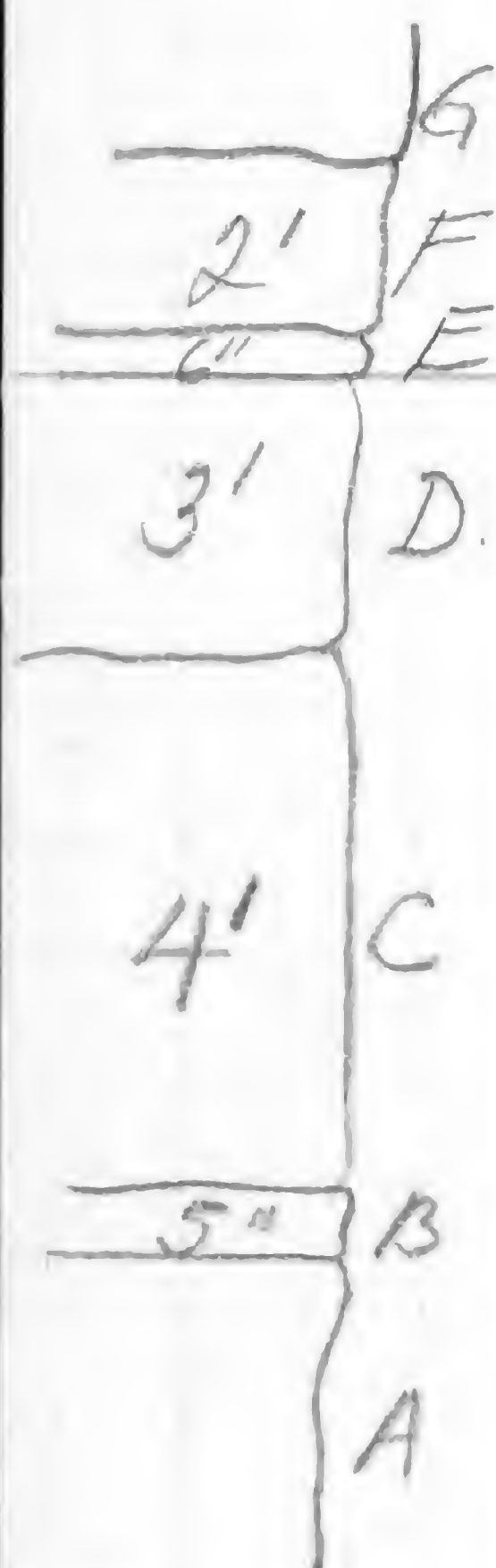
A = Silurian? without fossils and no effort made to get them.

B- 5"-hard calcareous bed with many small cup corals.

C- 4' earthy gray to yellow gray fairly thick bedded limestone having a shaly fracture into irregular plates. Fossils abundant.

(41)

1986



large wide *Spirifer* in bottom foot,  
*Pentamerella*, coarse-ribbed  
*Styria* (*bellula* type) in lower 3".

The upper 2' contain modules  
 of rotten chert, big *Strophodont*  
*Pholidostrophia*, large  
*Spirifer*.

D - 3' heavier bedded, hard  
 yellow gray limestone with  
 imp. corals, *Schizophoria*.  
 This limestone is very impure  
 with brownish silt. The  
 line is leached. Upper 2' are  
 coarsely crystalline ls. and  
 abundant in *Pholidostrophia*,  
*Strophodont* and leave  
*Cyrtina* (*unbrata*?) *A. bellula*  
 about 6" below top.

E - 6" green shale

F - 2' - Louisiana ls.

G. Thin bedded ss. The lower  
 surface is very irregular  
 indicating an unconformity.



(42)

1987  
1987

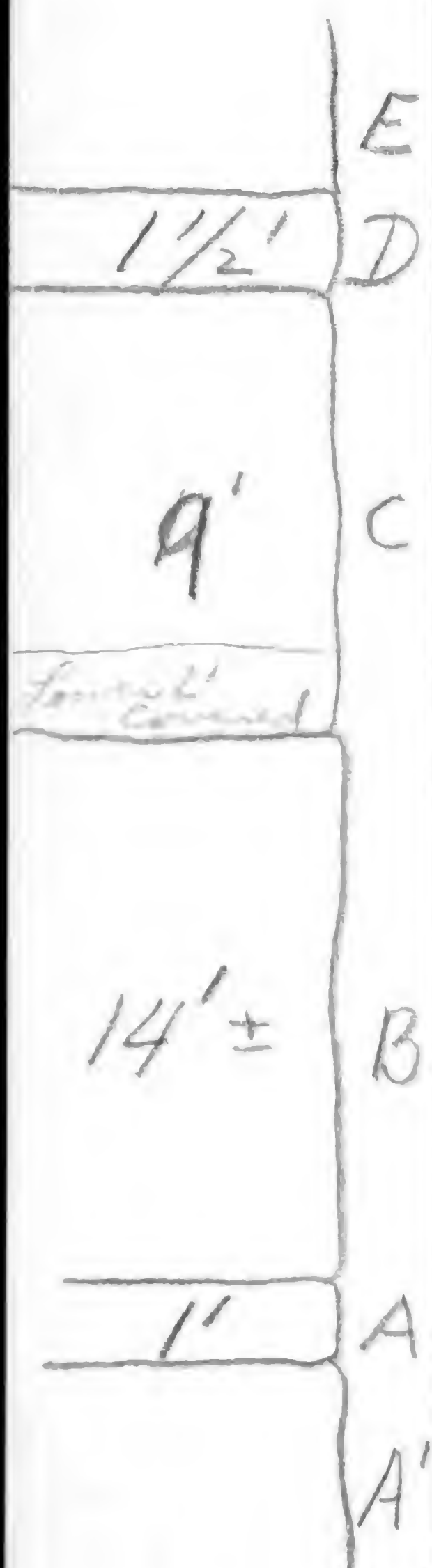
Section in Salt Spring Hollow  
N Cr. 16 - 115 - 2W Hardin □.

A' - seems to be definitely Silurian and has nothing to do with the Dev. It is crinoidal and I saw what appeared to be a *Leptaena*.

A - 1' hard gray limestone in which I saw no fossils. May be Silurian. Hard, blue ls. when fresh but weathering yellow and greenish gray.

B - yellow gray earthy shaly limestone abounding in small corals in the lower foot. In the next foot *Schizophoria* is abundant with wide-winged *Spinifers*. *Schuchertella* near top of interval with big *Stropheodonta*.

C. Hard earthy limestone yellow gray when weathered. becoming increasingly crinoidal toward the top where it has many fossils. *Cyrtina* is very abundant in bed just below topmost one. *Schizophoria* abundant in lower half of C. *Prismatophyllum* at about top and small cup corals numerous in upper half.



(43)

1888

D-brown sandstone, case-hardened on exterior but moderately and soft and sugary Cranaena, Athyris etc. abundant Structure of SS  $N 45^{\circ} E 1^{\circ} SE$ . The top surface of the ss is covered by Tridacnals, some of large size. Large cupcorals occur in the ss.

Handleveling a side-gully produced 23' as total thickness.

E-green shale in bank at top of SS.







August 24.

Spent morning in first hollow south of Kitesville. Collected for about 2 hours. Walked up Hollow  $\frac{1}{4}$  mile up from spring. Found loose ss blocks near spring but never saw them in place. It is possible that the fauna from this place belongs in the basal foot at Salt Spring Hollow where *Cystiphyllum* is common. This coral is fairly common in the fauna south of Kitesville.

Right after lunch we visited the hill slope SE of Batchtown but saw no continuous section. The Silurian makes ledges  $\frac{1}{3}$  -  $\frac{1}{2}$  way up the hillside but the Devonian is not well shown. One piece of ss float indicated the presence of this layer. The median layers of the four feet present are hard yellow brown limestone with crinoidal debris.

Monterey

School

The top of the hill at Monterey School is made up chiefly of Devonian which is about 11 feet thick. The upper inch or two is a veneer of fine-grained ss. The upper 6-8 feet are the best exposed. Where fresh the



upper 5' are bluish hard limestone with cup corals and *Pisomastophyllum* in the top layer.

*Schizophoria* is abundant 15"-18" below the top. *Cyrtina* occurs near the top. Wide-lined *Spirifers* are abundant throughout. The *Atypa* bellula type occurs in the upper beds. *Pholidostrophia* and a large *Strophodont*, possibly *halleri* also occurs. When weathered all but the uppermost bed seems to check into thin plates. In the middle and lower portions shaly parts weather yellow brown. On the whole the section here is more homogeneous and calcareous than the beds to the north.

Top layer here is 1"-2" of fine grained ss in stringers mixed with limestone and containing rolled fossils. This may represent the ss bed.

(46)

1991

1991

August 25

Section along old road



NW 1/4 SW 1/4 B-115-2W, 2 miles  
SSW of Hardin, Ill.

A - Silurian

B - 11' fairly heavy-bedded  
yellow-weathering argillaceous  
limestone becoming heavier  
bedded and somewhat more  
crystalline toward the top.  
Large *Spirifer* is present in B.

C - Harder heavier bedded ls.  
containing much shell debris  
with many small *Atrypa*,  
*Pholidostrophia*, small and large  
*Stropheodonta*, large rolled over  
*Favosites*. *Orthis* abundant in middle  
in a breccia

D - 6' ? covered

E - 3' ± Lithographic Louisiana ls.

No ss. was seen in this  
section either in place or loose.  
The *Solen* fauna was not seen  
at the base.



(47)

1992

Center east line NE/4 22-115-24W =  
Aug. 25!

8' upper part Devonian heavy bedded limestone approximately corresponding to C. of previous section. The slabs shown about here show abundance of small *Atrypa*, *Cyrtina umbonata*, small water worn cup corals, small *Strophodonts*, *Pholidostrophia*, *Schizophoria* about 4' below top, wide-hinged *Spinifer*. *Pneumatophyllum*

At nose of hill to north most of Devonian except base is shown and is about 20-23 feet thick. No ss was seen at either place and what lower beds are visible are of the yellow shaly type and with well preserved cup corals. Upper beds contain water-worn corals.

Aug 25<sup>2</sup>

NW/4 NE/4 SE/4 27-115-24W between 2 houses on S bank 10 feet above stream comes contact of Silurian and Devonian. About 12' of Dev. showing mostly of yellow earthy limestone with light yellow chert. Blocks about one foot from base yielded large *Spinifer* but we saw no trace of the *Scutellum* fauna.





(48)

1993

1993

NW corner

Kuteville N-branch

Aug 25<sup>3</sup>

NE<sup>1</sup>/<sub>4</sub> NE<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> 16-11S-2W

A' - hard blue ls. Silurian

A - 6" hard dark brown weathered limestone with wide-hinged *Spirifer*. This bed is welded directly to the Silurian

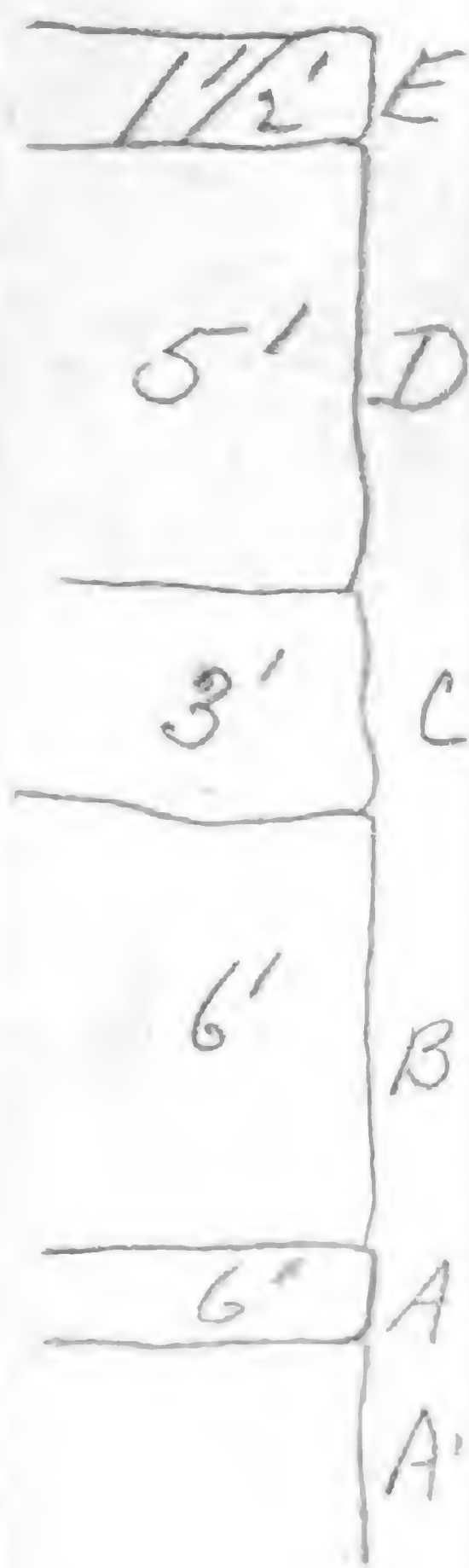
B - covered 6'

C - 3' shaly weathering limestone with many chert nodules. Yellowish earthy ls.

D - Here is an abrupt change the limestone becoming abundantly fossiliferous from having been sparsely fossiliferous. The chert disappears. *Pholidostrophia* becomes abundant. Rolled corals are scattered through. Big *Strophodontia* is common. Some of the layers are a veritable shell breccia. Brecciated *Cyrtina* are abundant 2' below the top.

Small *Atrypa*, big *Prismatophyllum*  
E - 1/2 feet sugary ss. with large *Atrypa*, *Strophodontia*, etc.

No evidence of *Sentellum* beds was seen.



(49)

881

After visiting the above section we went back to the first hollow south of Kutzville to see if we had missed the Silurian. In walking up the creek no Silurian was seen in place, nor was any Silurian float seen. We did however see some greenish clay in the <sup>bank</sup> not far above the main road which we took to be Maquoketa shale. Maquoketa shale also appeared on the slope of Herkhill just SW of the 20 in section 20. This suggests some sort of structure. The *Scutellum* fauna was seen nowhere else on the quadrangle except in this one little patch. Cloud & I stated that 8 feet of these beds are present but after seeing the place again this figure seems very excessive. What I probably mean is that 8 feet intervene between the base of these *Scutellum* beds and the first of the yellow platy limestones.



(50)

Aug. 26 1893

Jerseyville Hollow

A 26

0.4 mile N of  
City line, 1 mile

N of main St.  
in Jerseyville  
Hollow

F - Dark bluish gray shale  
with conchoidal fracture and  
brownish white streak.

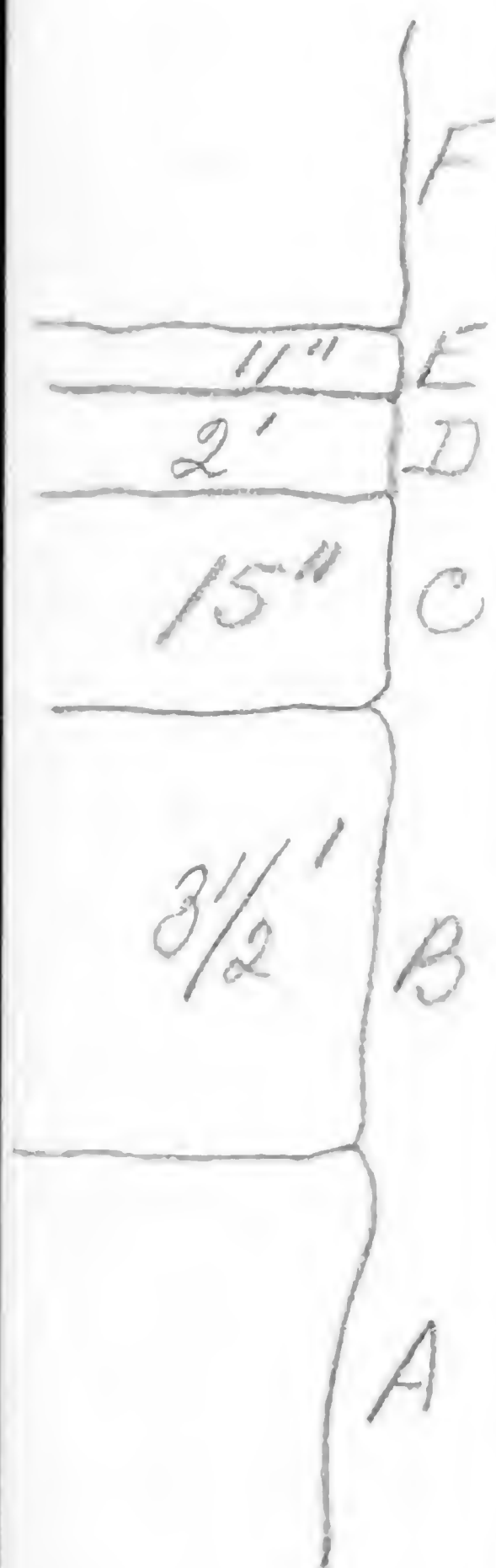
E - Gray, thin bedded limestone  
with green glauconite? and oolite  
at base. Fossils like those of  
Hamburg oolite. - 11"

D - Black shale 2'. Contains  
brown spores. Fissile, breaking  
into thin flat plates. Brown  
streak.

C - 15" of brownish gray, thin  
bedded shaly chert. ls that  
breaks into thin plates with  
irregular surfaces. Cavities filled  
with large calcite xls are common.  
The fauna is sparse consisting  
of *Leptostrophia* a, *Atrypa* ac,  
*Cyrtina umbonata*? and a small  
*Spirifer*, *Bomphoceras*.

B - 3 1/2' - light gray to yellowish  
ashen, earthy ls. breaking into  
conchoidal plates. Bluish worm?  
markings but fossils not seen.  
*Leptostrophia* very rare.

A - Yellow dolomite - Silurian.





(57)

LWCC

1996

Aug. 26<sup>1</sup>

Section along road, east side  
0.7 miles south of Otter Creek.  
Center W line 9-7N-13W.

A - Silurian

Loess

7'

C

B. Shaly weathering thick bedded limestone with abundance of chert nodules. Pentamerella, big Spirifer, small coarse ribbed A. bellula, scattered cup corals,

7'

B

C. The cessation of chert and a few different fossils separates the two layers. Bed B contains much chert but the fossils are more scattered. C contains in its lower part big Stropheodonta, Cyrtina, Pholidostrophia abundant, scattered cup corals, Schizophoria, A. bellula type. The top is quite massive and hard with big Spirifer, locally found Leptostrophia in upper beds. Topmost bed is 6" thick, very hard and partially dolomitized. No ss was seen.

A



52

1997

August 27

1997

Halls Summit



A - Jeff City

B - ss 2', hard white

C - green shale parting

D - 6' massive ledge, very fine grained almost lithographic ls with few fossils.

E 3 1/2-4' light gray ls packed with fossils. big *Strophodont* abundant. In lower foot. 1/2" - 3/4" shale 6" above base with *Strophodont*. Upper 2 1/2' abundant in big *Strophodont* & *Syringothyrus*.

Bed D varies up to 10 1/2' and bed E thickens to over 6'. At top of E is 1/2 foot of ls. with *apodonta*. The swelling of these ~~masses~~ masses suggests a possible reefy origin. This might explain patchy nature of Callaway.

(53)

1893

August 28.

In morning set out for Mineola and Danville. Rained for 2 hours but we went to see Mineola  $\frac{1}{2}$  mile north and  $\frac{1}{4}$  mile west of Danville until lunch time. In afternoon went to headwaters of Wippoorwill Creek where we saw Callaway.

The Callaway here contains reefy masses of gray algal limestone forming Trench. Core surrounded by hard heavy-bedded platy brown limestone often crinoidal. On the brown ls. comes gray limestone with scattered cup corals and *Crinacna* and a few other fossils. This overlies brown ls with fine lined *Atrypa*. Above all comes heavy bedded limestone but I did not determine its thickness.



(54)

1999

August 29

Section on Museum 19 about 1  
mile N of Big Spring.



A - pinkish crinoidal ls. fine  
grained - Kinnick or Joachim?

B - Light yellowish or cream  
colored fine-grained limestone  
with considerable sand

C - Brecciated gray limestone  
containing rounded and worn corals  
with pieces of gray *stromatopora*  
in a matrix of fine gray limestone

Bed C is channelled or thinns  
uphill and in the lower gray  
C - crinoidal limestone. In  
other words the bihermal material  
or conglomeratic is contemporaneous  
with crinoidal ls.

This limestone continues up to a  
culvert and its total thickness  
must be about 12' although  
it is impossible to be sure.

D - mostly covered but about 1 1/2'  
of hard bryozoan ls.

E - Biostrome beds. Thin layers  
6" of smooth or fine-grained  
limestone separated by irregular  
bands of bryozoan and coral



(55)

debris. Cup corals & byzons predominate. Near top comes *Oranaena* beds. Some lenses are a mass of byzons. Algae are common. Small bands of hard white sand occur between the ls beds.

Quarry 2 miles N of  
Danville

Thick bedded blue gray limestone about 12'-15' thick, lower half containing thin shale partings between the thick beds and containing cup corals, large *Stropheodonta*, large *Schizophoria* and large *Syringothyris*. This portion clearly corresponds to the upper part of the Callaway as exposed at Polk Summit.

Upper 6'-7' is more laminated rock of similar color to that below but containing broken material in form of broken byzons, algae, and cup corals. The *Oranaena Schizophoria* bed comes first above the lower 7'.

On top of the Callaway and appearing framentous to it is a sugary yellow ss.

Took picture here (9)



57

2001

County N one mile N of junction with  
Old US 40. on NW 1/4 SW 1/4 NW 1/4 29-48N-6W

Roadside, County Road N about  
3/4 mile E of Williamsburg and one

1/2 mile N of US 40. ~~SE NE 30 48N-6W~~  
Actually about a mile N of US 40 (old)

"Mincola" at base rests on  
Plattin and seems to fill a channel  
in the Plattin as it butts against  
it as well as overlying it to the  
N. Gray crinoidal ls. with  
Pentamerella, blastoids + crinoids.  
about 2' thick.

A - is the Plattin

B. is 2' of Mincola-type with  
crinoids and blastoids.

C. is hard blue gray limestone  
abundant bryozoan and digitate  
Favosites, and massive gray  
limestone the flanks of a nearly  
hidden hump. Strombodes.

D. is thin-bedded inter-reef  
material with Atrypa, bryozoans  
and digitate Favosites. Blastoids  
and Stenocrinus? present

E. - massive ls without bedding  
and containing many Billingsella  
Prismatophyllum

This dovetails into D' which  
is brown thinner bedded  
ls. with many corals as in D.





Blasoids & Stereocrinus also present.

In front of the house at the curve are 4' more of crinoidal gray ls. with Stereocrinus, Stenocrinus and Prismaophyllum.

James V. Barnes helped us to see these exposures.

B - The basal two - four inches of the yellowish crinoidal limestone contained black phosphatic concretions like those in the basal Beechwood. In fact the so-called Mineola is suggestive of Beechwood. This exposure indicates I think that the "Mineola" is only a phase of the Callaway. The bed B is difficult to follow S along the road as it seems to thin and lose its crinoidal character in that direction.

Took picture here (10)



(58)

2003

August 30

## Bellama Springs

A - yellow gray fine grained dolomite

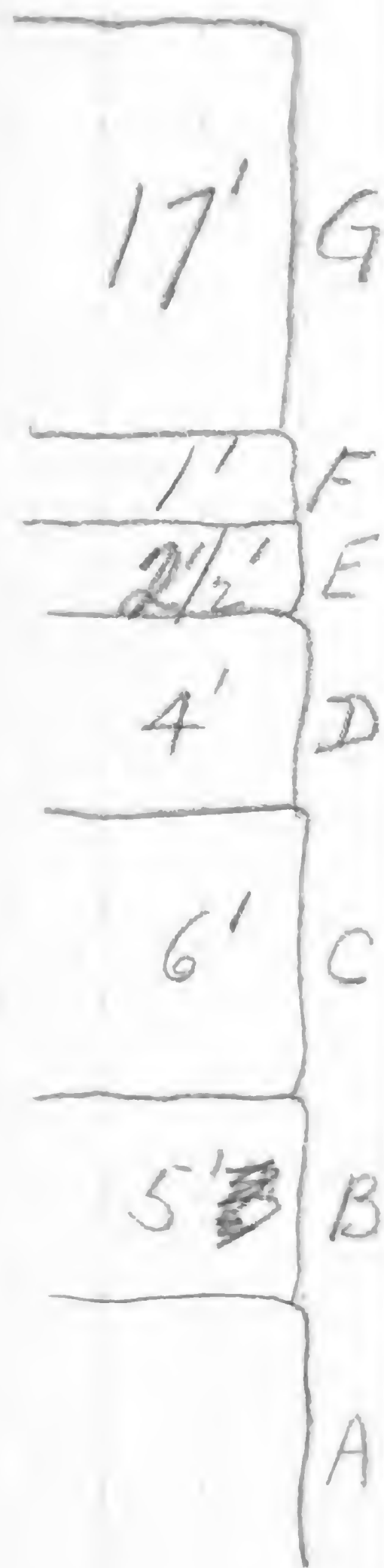
B - 5' ~~4~~ light gray fine-grained limestone in a massive ledge possibly a low reef, with worn *Prismatophyllum* and brecciated pieces of limestone and small lenses of ss. upper part very sandy

C - 6' hard white fine-grained ss. forming a conspicuous ledge possibly filling space between two reef humps.

D - gray fine-grained limestone very sandy in upper part and with scattered crinoid debris.

E - Two feet gray limestone with shaly partings above and below containing abundance of *Atrypa missouriensis*, *Cyrtina* and small spiniferid. When weathered becomes brown

F - 1' hard darker gray granular (very fine) weathering brownish gray containing big *Strophodonts*, *Spirifer*, *Leptæna*, *Leptæna*





(59)

2001

G. About 17' hard massive limestone, light gray and weathering dull gray with scattered cup corals and great quantities of thin elongate algae or bryozoans. Uppermost beds lighter colored and smooth. Small *Cranaena* occurs in about the middle.

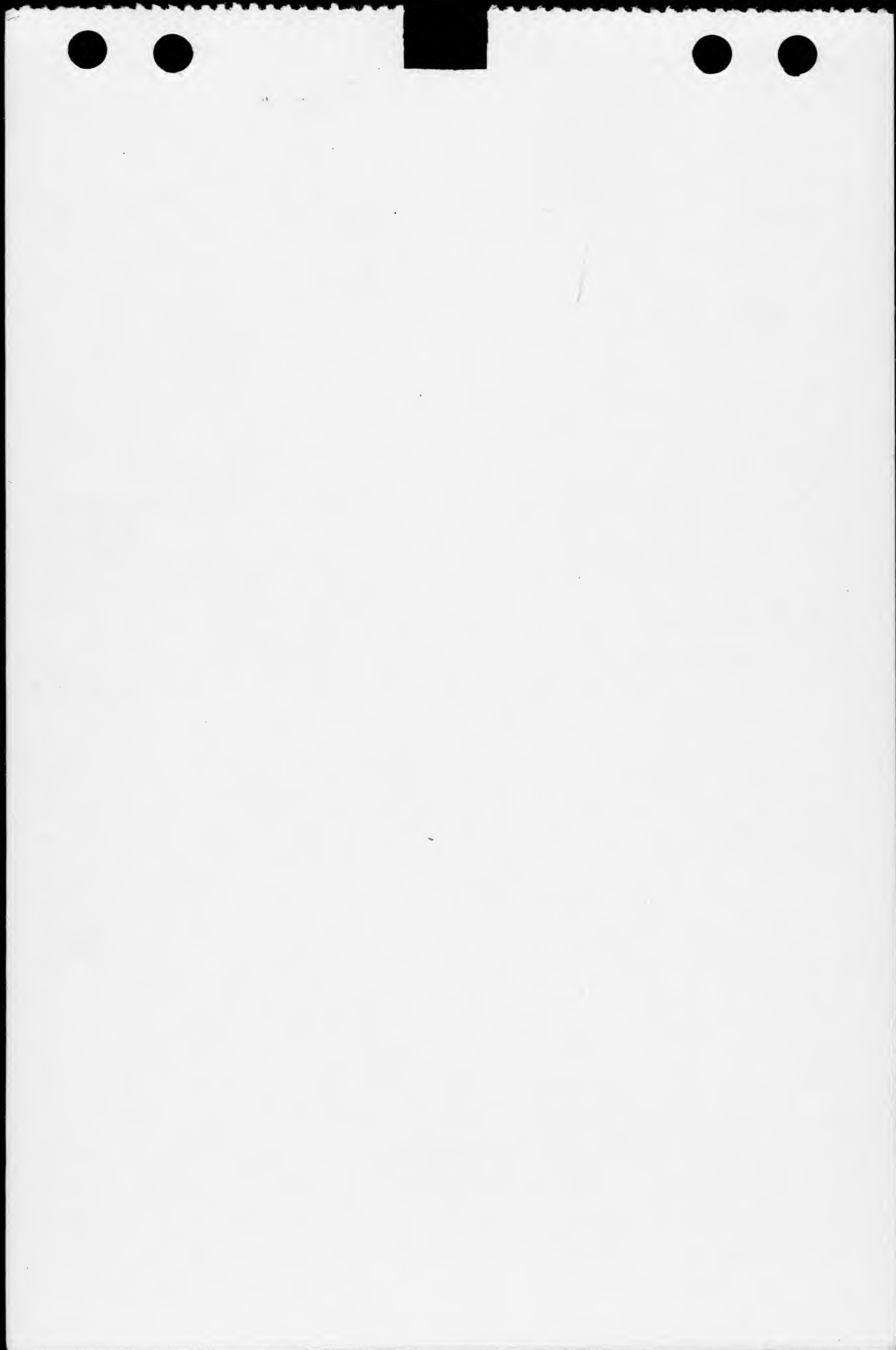
Aug 31

On Mission R. bluffs along RR west of Bonne Femme River. Cooper resting on Jeff City with good unconformity. Conglomeratic at base. St. Peter coming in upstream about  $\frac{1}{2}$  mile. Callaway with few fossils resting on Cooper with unconformity.

Newberry beds.

On US 63 south of Ashland 6.1 miles (3.3 miles south of Hartsburg intersection) road to east with cattle tank on south east side of intersection. Take country road 1.25 miles east, bearing right at fork, to small school-house on hill. Intermittent stream crosses road





and beside it an old road.  
Follow <sup>on foot</sup> old road and stream slightly  
north of east for about  $\frac{1}{4}$  mile  
to Newberia ledge. Here 4-5'  
of limestone are packed with  
Newberia and a few cup corals  
and Favosites. Coarser is 10-15'  
thick with upper 10" just below  
Newberia fossiliferous.

Follow woods road on foot  
keeping to center road as two  
forks go off road. Center road  
is on south side of creek about  
 $\frac{1}{8}$  mile from school. Road and  
creek become one at outcrop.



$$\begin{array}{r} 69 \\ 12 \overline{) 828} \\ \underline{24} \\ 58 \\ \underline{48} \\ 108 \\ \underline{108} \\ 0 \end{array} \quad 6.8$$

2

(6462)

2006

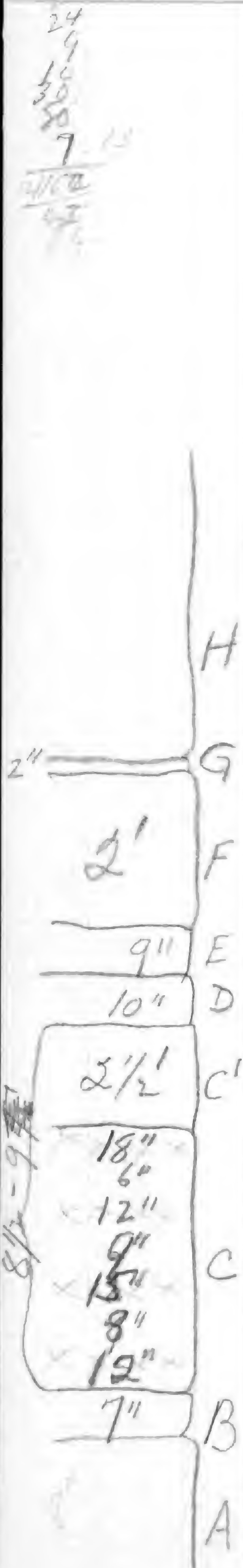
September 1

Bobs Creek, near Brussel, Mo  
Sec. 34, Center line SE 1/4 34-50N-1E.

A - Magnopora

B - gray to yellow gray ~~limestone~~  
limestone, fine grained, earthy  
with numerous phosphate  
modules up to two inches

C - C' - About 9' of yellow brown  
weathering, fine grained earthy  
limestone divisible into several  
separate layers. C - consists of  
four distinct layers of small  
Cystiphyllum the lowest layer 12"  
separated by about 8" of yellow  
brown earthy limestone with  
wide ~~Spirifer~~, ~~Strophodont~~, small  
~~Atypa~~. When fresh this layer  
is earthy blue gray. The second  
Cystiphyllum band is 15" thick and  
is separated from the third by  
9" of limestone, blue gray to yellowish  
containing Strophodont, ~~small Spirifer~~,  
wide Spirifer, small Atypa. This  
is separated from the last thick  
coral layer by ~~to~~ 6" of blue gray  
earthy ls. The top Cystiphyllum  
bed is 18" thick. These thicknesses  
are approximate as the beds





(63)

varying in thickness. C'- about 2 1/2' similar limestone containing scattered *Cystiphyllum* and some chert nodules in upper foot; also digitate *Favosites*, wide hinged *Spinifer*. *Tentaculites*, *Strophodonts*, *Stictopora* *Elythra*.

D- 10" hard thick ledge earthy limestone with *Spinifer*, large cup coral, *Strophodonts*, *Schizophoria*

E- 9" shaly limestone making a retreat over which F hangs as a ledge.

F- 2' hard yellow limestone forming a massive ledge.

Abundant in fossils: *Strophodonts*, *A. bellula*, *Schizophoria*, wide hinged *Spinifer*. Much yellow-brown chert in the bed. This bed is weathered clean but no rock was seen in contact with it.

along the stream. Green shale occurs downstream some 20 yards and ~~partially~~ overlies the Devonian in a small rill.

A few loose *Cystiphyllum* were found above the outcrop and a 2" layer of loose chert probably representing the uppermost layer containing Devonian



(64)

2003

fossils.

G. - chert - 2" with *Cystiphyllum*  
and *Atrypa*

H - Green Saverton shale  
directly overlies outcrop in a  
small hill near center of the  
exposure.

This outcrop suggests chiefly  
the lower half of the Calhoun  
County sequence, about through  
the prominent *Schizophoria*  
bed. *Cyrtina* is not abundant  
and some of the upper layers  
may be absent. Total  
thickness is  $13\frac{1}{2}'$ .

This place was difficult to locate  
at first because the road to  
Bussels has been relocated. The  
road now crosses Bobo Creek a few  
rods north of the outcrop which is  
readily visible from the road as  
one crosses the stream. The crossing  
with Bobo Creek is about  $\frac{3}{8}$  mile  
due west of Bussels and is thus  
in center east line SE  $\frac{1}{4}$  34 - 50N - 1E



(65)

2009

September 2.

Hill on west side Mo. 79 about 2-3 miles NNW of Elsberry. We climbed to top of hill overlooking RR and found the hill roughly divisible into Magnolia and Silurian. The rock at the very top is a white, dense, stylolitic limestone. At base of cliffs some 20' below top of hill I saw small cup corals, *Cliftonia*? and a *Strophomenoid*. All the rock above the Magnolia, is Silurian according to my view and not Devonian as supposed.

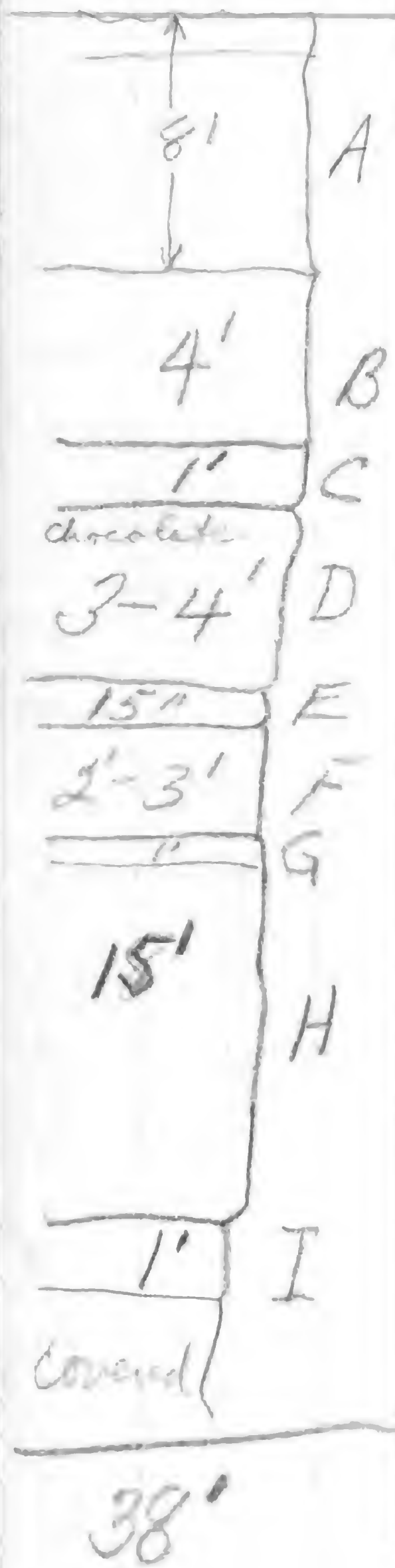
(60)

2020

September 3.

Section along Creek W $\frac{1}{2}$ 11-56N-SW

Section begins 300 paces from old bridge



A- 8'- gray earthy calcareous shale with layers of earthy limestone which may not yet have slacked into shale fragments. The upper 2' is yellow in the end in white and yellow gray outside. Occasional *Nerbertina*.

B- 4'- hard earthy fine grained limestone breaking in thick conchoidal plates at a high angle to the bedding. *Atrypa* 85 paces down from B occurs a foot of shaly ls. abounding in corals. This probably belongs to the massive bed B.

D- the coral bed rests on chocolate colored dense, lithographic ls. with big calcite nodules.

For the next 115 paces from C (700 paces from bridge) we walk on the top of the chocolate bed to a point where 3 $\frac{1}{2}$ ' of limestone is exposed. The chocolate bed makes the top ~~is~~ with sun-cracked light gray limestone below. These can be followed for 200 paces (900 paces below bridge).

At 900 paces is a small fall over another chocolate layer E.  
E - 15"



(67)

2011

F - 2'-3' gray limestone enclosing some blocks of chocolate at 945 paces. This bed rests on thin platy limestone G.

G - 1' thin bedded oil calcareous oil rock with black layers of carbon, fish scales? and plant fragments.

At 1020 paces reached ~~limestone~~ sandy limestone, yellow when fractured. ~~It~~ <sup>well</sup> belongs to the top of the Newberia beds. At this place 1040. The Newberia ranges through 8' of rock occurring just below the oil rock. I am using H for the Newberia layers.

At 1281 on east side stream is a big bank of Newberia with the valves shingled together forming a coquina of the shells. At 1300' comes a bluff at bend of stream showing 9 1/2' of sandy ls. The thin bedded character of the rock is brought into relief by solution. The sandy part standing out as thin more or less continuous ridges.

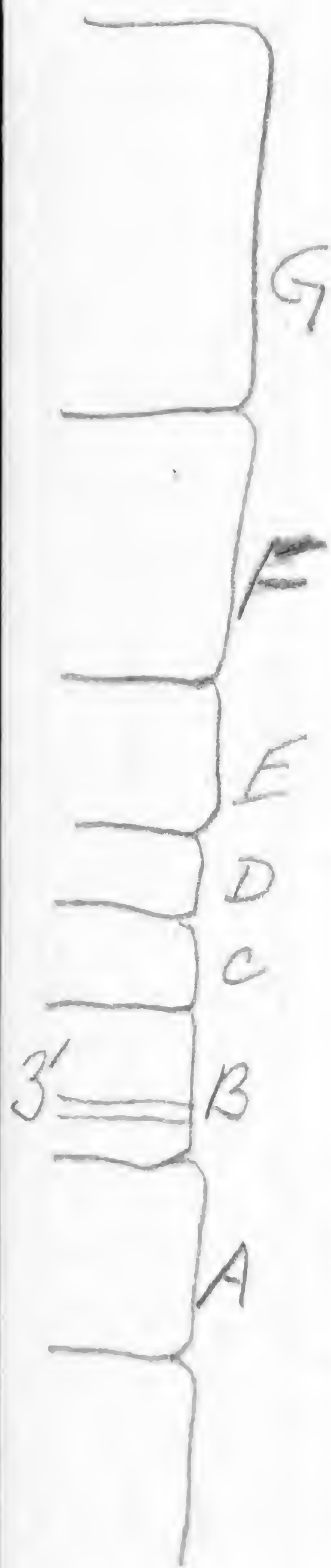
At 1378 we arrive at a chocolate bed after having descended 5 1/2' of Newberia limestone. This makes the total thickness of H about 15'. Chocolate bed I = 1 foot Highway bridge in sec 2 at 1471



(68)

2012

Visited section in  
SW  $\frac{1}{4}$  SE  $\frac{1}{4}$  15-56 N-5W.



A - Kimmerick

B - 3' - shaly, greenish gray,  
with 6" hard gray ls.

C - 2' dark gray ls.

D - 1' greenish gray shale

E - 8' - dark gray limestone  
with 1' of platy ls. at base

F - 15' sandstone, fine grained,  
conglomeratic at base with  
ls pebbles.

G - 12' Limestone dark gray,  
platy, fine grained often  
conglomeratic

B-E = Cooper

F = Hoing?

G = Callaway.

This section is given in  
Kansas Geol. Soc. Guide 1941. I  
do not follow the identification  
of Cooper and Callaway as  
neither have fossils and



(69)

2013

2013

The presence of a sand is no reason to divide them. I suspect it is all Cooper?

After lunch we visited locality 1 1/8 miles south of Rensselaer, the crinoid locality visited by me in 1936. This locality seems to be about NE 1/4 ~~of T4~~ 15-33N-6W and consists of at least 5 individual reef masses. These consist chiefly of brecciated, smooth fine grained ls in lower part and shell & coral breccia in upper part. The masses are 10-15' thick and according to Moore in Bronson rest on 30' of Cooper like rock. These *Stereocrinus* beds thus must overlie the Newberry.

2014

(70)

September 4.  
Section on Cedar Creek, W $\frac{1}{4}$  28-  
56 N - 6 W.

Section \ Faces S of bridge (2665)

2665

270

122

100

- |       |   |  |
|-------|---|--|
| 3'    | D | A - gray smooth reef ls.<br>some breccia 10' $\pm$   |
| 10'   | C | B - conchoidally fracturing<br>impure ls breaking in<br>thick plates at angle to the<br>bedding. Contains a patch<br>of Newberia in middle |
| 4-10' | B |  |
| 10'   | A | C - shaly weathering gray<br>ls and thin beds of sand-<br>cracked shale  |

D-3' ledge hard gray ls.

Above D are fully 15-20'  
of yellowish shaly rock and  
a thick 10' ledge of hard ls.  
Newberia was 14' above stream  
level.

500 paces above Newberia in  
a low fall in the stream bed  
Cyrtina occurs in great  
abundance in a fine-grained  
gray brown or chocolate  
weathering rock with small



(71)

2015

stringers of yellow to white chert.

At 847 paces many digitate  
fossils and a large subil.

At 1500 paces top surface  
of Kimmswick appears. At 1800<sup>+</sup>  
paces top of Kimmswick is 15'  
above stream level. At 2015 paces  
it is 25' above stream level.

2665 paces to bridge

destinade some 20-25' come  
in under the section measured  
2665' South of the bridge. This  
would make a total section of  
about 85'. The estimate is low 40'  
is nearer correct and the whole  
section would be about 100' thick





Section just S of bridge  
about 200 paces.

SW $\frac{1}{4}$ SW $\frac{1}{4}$  21-56 N-6W.

A-2' of Kimmurick.

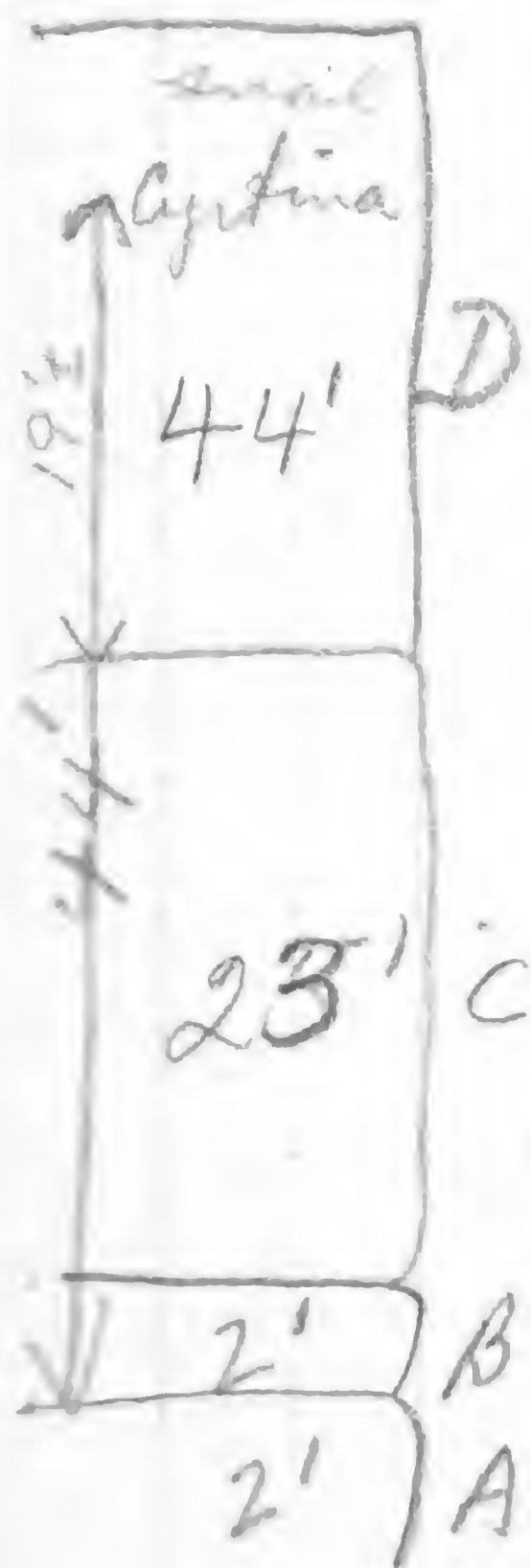
B-2' covered

C-25' massive light gray  
limestone.

D- at 16'-22' above C comes  
Cyrtina which probably corresponds  
to the Cyrtina bed down the Creek.  
This Cyrtina bed is about 18' below  
Newberria down the Creek. This  
would then add 40'. Total  
thickness of D is about 44' and  
it consists chiefly of shaly  
fracturing light gray limestone  
containing a large snail in  
the top 5'.

The Kimmurick here is only  
2' above stream level, thus  
the Devonian here dips north  
whereas farther down the Creek  
it dips south about 80' per mile.

The upper snail may mark  
the appearance ~~of the~~ or  
position of the reef beds. The  
whole 100-120' consists of  
the gray limestone.



9.5



(73)

2017

Cedar Creek crosses road about 1/4 mile east of road corner in center N line SE 1/4 20-56 N-6W but is shown incorrectly on map.

Section by A. S. Warthin

A - Kummewick

B - light gray brecciated ls.

C - " " fine grained massive ls.

D - " " fine grained massive with Cyrtina & Chert 4'

E 8' - light gray platy weathering ls.

F - 10' light gray <sup>sub.</sup> lithography weathering nodular, ~~sub.~~  
~~weathering nodular, sub.~~

G - 4' - 10' laminated massive, impure, buff ls. with Newberia in middle of 4' part. 2' bed of corals <sup>cap</sup> (4'?) Newberia same as 9/3/42.

H - 1' - 16' light gray sublitro-graphic, top 3" cherty; 4' below top prominent chocolate layer. Unconformity

I - 12' buff, laminated ls with fine sand & rare chert

Many Spirifers in basal foot

~~The whole section is very monotonous and of a~~

8' N

4' M

5' L

11' K

14' J

12' I

1-16' H

4'-10' G

10' F

8' E

4' D

6' C

15' B

A



(74)

2013

J-14' light gray finegrained  
dense massive ls. Solid  
ledge.

K- light <sup>gray</sup> irregularly bedded  
fine grained ls. with large  
small & digitate Favosites

L-5' covered

M-4' Louisiana ls.

N- Hannibal ss.

Total about 111'. With the 44'  
to Cyrtina the thickness comes  
to 119'. The Newbernia bed here  
probably correlates with Newbernia  
bed 4. of 9/3 section as both  
contain Atypa. Therefore coral  
bed with deep cupped Pisonato-  
phyllum is below Newbernia on  
Cedar Creek.

~~We are uncertain as to the~~  
~~position of the coral bed in this~~  
~~section but think it is over~~  
the Newbernia bed. The  
Newbernia bed on Cedar Creek  
has very little lateral extent.  
The whole section is very  
monotous and Cooper-like  
throughout.



(25)

2019

2023

391

September 5

Journeyed from Hannibal to  
Muscatine, Iowa. Had car  
serviced in afternoon.

September 6

Section along Mills Creek  
southeast of Milan from RR  
bridge S. to a point 1953' upstream from it.  
Outcrop about 50 yds. upstream  
from RR Bridge is of about 3'  
of blocky light gray limestone,  
fine grained, weathering to very  
irregular brownish gray surface.  
Corals are abundant - large  
*Cystiphyllum*, *Billingia*, *Stromatopora*,  
*Heliohyllum*, *Stromatopora* and  
a few other fossils. *Prismatophylloids*.  
This is bed 3 of Savage's sequence.

300 paces upstream (south) from  
highway bridge is old quarry and  
bluff showing following

12'	C
4'	B
8'	A

A - Same as Savage's 3 with  
a broad shelf 3-4' above  
river level which shows  
*A. independence*, *Sypidula*,  
big *Spinifer*. This is  
the *independence* zone.  
The 4-5' above the shelf



(26)

2020

showing the numerous *Atrypa* contain many *Billingia* and thus belong the lower beds.

The 8' here ~~includes the 5'~~ I think all belongs to the Solon formation. Its upper surfaces are very rough and hackly.

*Billingia* was seen to top of 8'

B - 4' beginning with 6" of shaly ls. with small corals. Then about 2' massive ls. with *Schizophoria* small *Cystiphyllum*, *At. bellula*. The upper foot is the same. This I think is Savage's no 4 and belongs to the bellula zone.

C - 12' shaly weathering ls. abounding in *Schizophoria*, *Stroph.* *halli* and the bellula assemblage. B is the same as the lower beds (*Cystiphyllum*) of the Calhoun County sequence and as bellula goes up to the ss this may be the whole Cedar Valley of Calhoun Co.

At 441 paces top of Solon is in stream bed

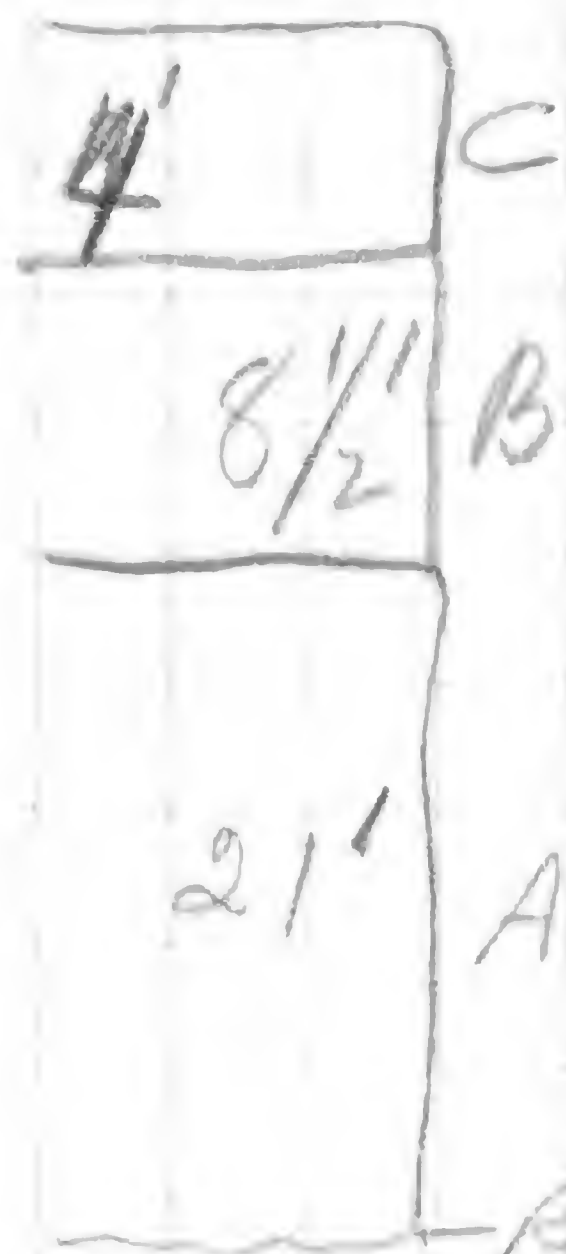
at 611 paces top of bed B is in river bed. The dip is strong to the south.

At 711 paces is a bluff on



(77)

on east side creek <sup>2021</sup> about 25' high. At 781 the bluff is still high and a section here is as follows:



A - bellula zone, the upper part of this zone has many small *Spirifer* various, fine lined *Atrypa*, *Schizophoria*, *Strophodonta halli*, massive *Byozoa*. I estimate 4' of bellula zone descended below stream at this place which makes the total 25' + the 4' of bed B from section downstream or a total of 29'.

*Chonetes schucherti* C in upper part. Bed B of this section should be added, to make 37 1/2' for this zone. B - 8 1/2' yellow weathering crinoidal limestone with fine-lined *Atrypa*, *Byozoa*, *Schizophoria*, *Chonetes* a. *Cyrtina*, sp. sub-*varicosus* type, *Strophodonta*.

C. hard irregularly bedded ls. light yellow gray in color, with *Prismatophyllum*, *Atrypa*, *Spirifer*, *Cyrtina*, *Favosites*. One layer is almost made up of *Cyrtina*. These C layers could



28

2062

be the top of the Calhoun Co.  
sequence.

Creek in Sections NENE 26-17N-3W  
~~south of Moline~~, Illinois  
West of Moline,

A-325 paces down from highway  
bridge appear 3' of rock, the  
lowest foot containing *Athyris* in  
abundance, small *Strophodontia*.  
The middle foot with yellow weathering  
fucoidally marked rock. The upper  
foot with *Is.* *enytinae*, small fine-  
lined *Athyra*, *Cyrtina* in shaly  
weathering ls.

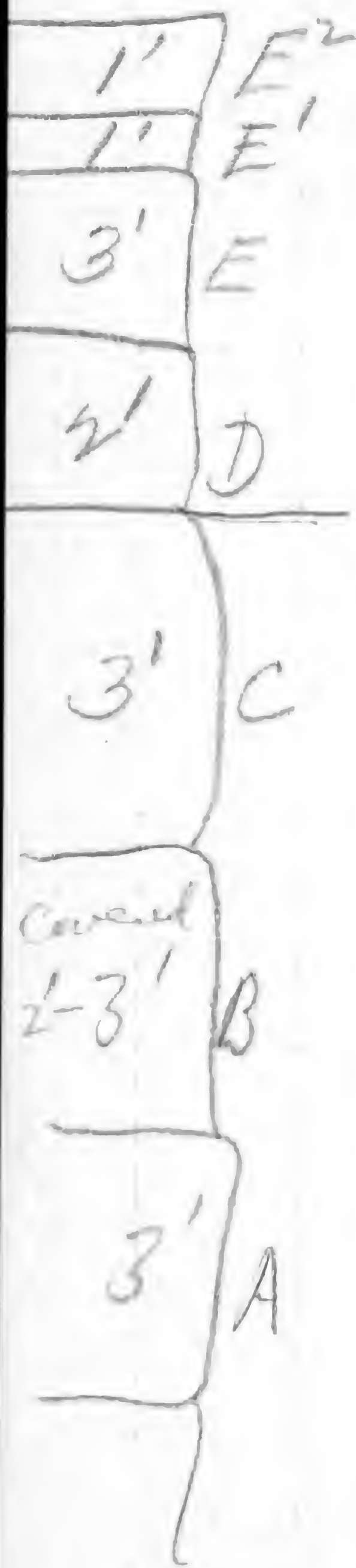
B-2'-3' covered

250 paces above A is another  
falls with a covered interval  
between of 2-3'.

C-Hard massive irregularly  
fracturing ls. with large *Athyra*,  
a few cup corals, the upper foot  
with cup corals and *Schizophoria*.  
Light gray weathering brown  
& greenish gray.

Bridge and road cross at  
325 paces

D Upper 2 feet below bridge are





(79)

2023

Stomatopora ls. with Cranaena  
and Cananophoria

E - About 3' greenish gray  
weathering to brown band  
impure ls. with large  
Stropheodonta & Spirifer which  
suggest upper Callaway as at  
Holt Summit.

# 70 paces above bridge is  
a patch of brown ls. with large  
Stropheodonta. This adds a foot  
to E as E!

E<sup>2</sup> another foot of dolomitic  
rock making to pt. upper 5'  
are dolomitic. We went to 200 paces  
upstream

(80)

2001

September 7.

Morning rain. Went to Canaan locality on east of Buffalo and collected till 1 P.M. Then went to Sweetland Creek for a look at the Sweetland Creek form. and Upper Cedar Valley. Latter contains considerable black shale at this place.

September 8.

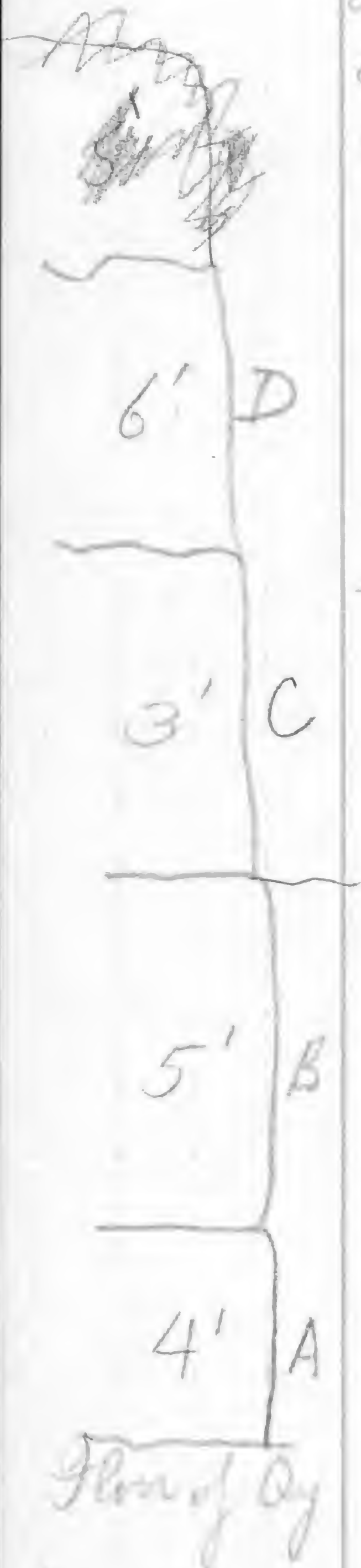
Quarry just N of W 61<sup>0.4</sup> miles east of Linwood.

A - 4' Upper Bellula zone with many *S. varicosus* & *Schizophoria*. Blue shaly ls.

B - Crinoidal limestone with shaly layers. 5'. Contains upper Bellula fossils with *Chonetes* Big *Spinifer*

C - sublithographic ls. stylolitic

D - 6' dark gray ls. containing *Athyrid* at top. crinoid debris





(81)

20.5

In afternoon visited both large quarries east of Buffalo. The one at Linwood showed a section from Davenport to uppermost *Bellula* zone. In west end of quarry a large sink or cave filled with Pennsylvanian shale and ss is exposed.

In the quarry (Dewey Portland Cement Co Plant) at Linwood Sta the section goes up through the *Athyris* bed and we made a good collection in this layer.

We did not see the overlying coral bed but this is the horizon that yielded *Strombodes* and which may = the base of the Callaway and the *Mineola* in which case Callaway would = *waterlooensis* (and *Pentamerella* coral zone) through the Coralville. The *Bellula* zone is undoubtedly missing from central Missouri.

(82)

2026

September 11

Went from Madison to Lake Church which is  $\frac{1}{2}$  mile east of Wis. Hy 141 8 miles N of Port Washington. The quarry is 1 mile E +  $\frac{1}{2}$  mile S of Lake Church. Now filled with water within a few feet of top. Upper rock light gray brown dolomite in thick layers. *Strophodont* *musculosa* and *Perrinitophyllum* seen in the ledges on E side quarry and as low as 5-10' below top. The *Chonetes* beds were not seen and are undoubtedly under water.

The *Chonetes* beds must belong to the Dundee as no such *Chonetes* occurs in the Cedar Valley and *Chonetes* is a rare Cedar Valley fossil. The *C. schuchertianus* = the *Chonetes* in the Rapid.

The *Strophodont* *musculosa* beds might have Cedar Valley affinities but if *Chonetes* is abundant in these beds that idea probably will not work.

From Lake Church went south and looked at cut in Thiensville formation on Wis. Hy 57 about 2 miles north of



Thiensville. Then we went down to the Milwaukee Museum and had a look at the collections there. These collections of Milwaukee formation are quite small. Returned to Port Washington for night.

September 12

Went to Dmackers quarry, 3.5 miles north of Port Washington. and  $1\frac{3}{4}$  mile N of Knellsville where the road trifurcates. The middle fork goes to quarry which is located beside the RR track. The Devonian is about 6-8' thick of light tan dolomite in layers about 2"-4" thick. The *Fimbriospira* occurs 5' above the Silurian. *Spyridula* was taken just above it and the fine-lined *Atrypa* occur with *Fimbriospira* and *Spyridula*. Probably the whole of the Lake Church is Delaware and none of it correlates with the Rogers City.

(84)

2023

September 13.

Packed fossil all day.

Send Newell several genera of brachiopods (Recent) showing loops. Mount up two for display.

Send Norman negatives of my silicified fossil talk and of Storm-rollers.

Loc 1413 E. of mouth of Beane R on reef, middle of Beane fm. Gift from W. H. Tumbachel.

September 14.

Spent day with Tumbachel and Newell.

September 15.

N. D. Newell

90 Nellie M. Newell

161 N. Oak St.,

London, Ohio

Send Workman samples of about 70 grams each from the various layers of the Bakeoven sequence above Microcyclus



(85)

2020

September 16

Spent day with Workman at Illinois Geol. Survey office. Workman is getting ready his big study of the Illinois subsurface. In eastern Illinois he has a big development of Wapsipineon which fingers southwestward as it thins down into Dutch Creek. This is overlain by Cedar Valley which is generally regarded as equivalent to the Hamilton. Workman and the Illinois crowd seem to think that the Wapsipineon is of Onondaga age.

According to these people the Geneva occurs under the Jeffersonville and thus may be ~~the~~ Detroit River and not the lateral equivalent of the Jeffersonville. Mr. Conzbell claimed the Geneva as a separate formation also.



(86)

2030

Check Linnwood-Kenwood on chart

Look up Mississippian corals  
for Easton.

Send Cooper some plates of  
shale with *Hamorocella*.

Test the idea that all the  
Hamilton above the coral bed  
with *Turgidoleptus* in Perry County  
is Tully and = to the Alb. That  
*Spanacotetes* fossils could possibly  
admit such things as *Lingulella*  
in the Tully.

Mr. Anderson of Gulf at Mattoon

Savage collections  
U. of Illinois

*Sp. acuminatus* No. D-2813 complete  
specimen partially matrix covered  
Fairly wide hinge. Might be *P.*  
*acuminatus*. Barlow

856h from Bake-oven-3  
specimens all fragmentary. 2 are  
not *Paraspirifer* but one is a  
good *Paraspirifer*. Lithology is Delaware  
No locality other than Jackson County

555v contains one *Paraspirifer*  
the counterpart to 556h above.  
One other crushed ventral in the



(87)

21501

lot is apparently a *Paraspirifer*  
555 ~~u~~ - ? *Paraspirifer*  
556 l - probably not *Paraspirifer*

*Camerozonia* is OK but does  
not look like *gainesi*


556 u *Strophonella* n. sp. is a  
genuine *Strophonella*

56 d - *Chonetes yandellanus*  
looks like the *Chonetes* zone  
20' below *Microcyclus*.

*Spirifer gregarius* - 555 e - 6  
specimens prove all to be *Cyrtina*

*Megalantaris* - 556 p = *Phipidomella*  
and *Strophodont*.

*Spirifer lucasensis* from 568 f  
is recorded as *Spirifer* n. sp.  
No. D424. Mtn. Glen section

*Sp. varicosus* D420 from 555 d  
is cyrtinoid in appearance with  
flat hypochline interior 

A specimen suggesting *S. lucasensis*  
is D434 from 556 c. It is  
not well preserved but is near  
that species.



Dalmanites, 558T, 570, 558g, 558n, 56n,  
56p, 558m.

*Cameroiphoria gaimesi* are in dark or  
chocolate matrix. The specimens  
are larger than *C. gaimesi* and are  
probably new. Borrow D 505  
Horizon 5x.

Sp. n. sp = *Sp. lucasensis* 568b  
D 424 Borrow.

*Centronella glaucofaga* may = n. sp. 558p  
D 451.

555e - lot of *C. yandellanus* D 589  
contains *Sp. lucasensis* on  
largest piece in box

556v *Centronella* in ss.

555n *Pentamerella pavillionensis*  
in chocolate matrix.

D 604 *S. patersoni* strongly wrinkled

D 2377 excellent smaller specimens

Genuine *Pentamerella* from 555f

D 610 looks like *Xlu Grand Tower*

555g - *Megalantaris* looks like  
imperfect *Strophodontia* and shows  
granules of the *Strophomenidae*.  
A second specimen is too poor to  
determine.



(89)

2033

Dalmanites 553g in chocolate matrix

553w small Strophonella, probably  
new in sandy and light xlm matrix

553W - Nucleospira ventricosa is rubbed  
and suggests a Pentamerella dorsal.

D 636 from 555w and called  
Athyris vittata is a baby  
Pentamerella or Camerophoria. At  
any rate median septum is present  
in ventral valve.

5x Nucleogrinus sp. D 700 Bonow  
555e - Tentaculites contains Sp. lucasensis

568b - Cyrtina ham. = Sp. lucasensis  
D 721.

Sp. nov. 553e = Sp. lucasensis D 717  
" " 568a = " " D 793

553p - Nucleospira OK. ventricosa?

Glyptodesma erectum 568d is more  
likely a Leiopteria  
553a - Strophalosia truncata is a  
Productella

558 - Sp. macrothyris is called  
Hamilton - it can't be.

(95)

2001

857a - *Spinifer perlamellosa* called Hamilton is like *Spinifer* (lamellose) from Wittenberg).

85b *Leptacrisca concava* = *St. inaequata* type.

555c has *Athyris*-may = *Microcyclus*

568e - *Microcyclus*

579g, 567g - contain fine sp. granular types in a punky sandy rock. Lithologically 579g + 567g may be =.

579e *Cyclorhina* - looks OK. D1049 Contains *Camerozonia*.

568j - *Sp. divanicata* type OK  
D1071 Borrow

555d - *Sp. divanicata* very doubtful.

554x - *Microcyclus* dians

*Parazyga lursuta* 880i is definitely a *Parazyga*

D2216 *Meristella* doris excellent specimen, complete. 879e

*Cypriocardinia induta* in oolite 580g-h.

568p - NE 1/4 34 - 11S - 2W - all 68s. Mtn. Bl. section.

555 = Backbone SE 1/4 10-12 S-2W

558 = Backbone NW 1/4 35-13S-2W.

580 must = Darity Creek 2



Loc. 799 in Savage notebook 62, p. 60, 9/5/07  
574 - NB 1/4 2 - 115 - 3W.

(91)

2003

Alto ls. - no locality - D 2645  
*Emmella* and a *Nucleospira*  
found a small free specimen

*Spifer gueri* D 2675 OK - no loc.

*C. gänesi* = n. sp. Backbone D 2727  
permission to clean it.

*Holstoceras* from Backbone

D 2774 *Cyclorhina speciosa* n. sp.  
said to be Alto, No loc.

*Mytilarca rectolatra* n. sp. - Alto  
no loc. D 2773

*Sp. arguta* n. sp. Alto no loc D 2770

*Sp. granulosa* D 3808 Alto pass ☐  
Bossett may = *Sp. divaricatus* Brown  
from Single ls.

*Crasseus subovatus* near  
*Andalusia* dill. Tapers posteriorly  
to form a distinctly ovate outline  
The shell is not the same as  
the one from Buffalo which is  
*C. elliptica*.

*C. elliptica* - This is the same  
as the shells we have from  
Buffalo. *Elliptica* has the low  
ventral umbo and beak, whereas  
*C. subovata* has an elongated beak



(92)

2006

*C. elliptica* tapers a little anteriorly but is distinctly shouldered at the postero-lateral extremities.

The huge *Cranaena* from Andalusia is *C. maxima* of Savage and this name may apply also to the Callaway shells.

The *Pugnoides subovata* may not be a *Camero-phoria*. It should be closely checked. It is not certain that these come from the *Cranaena* beds. Two lateral septa help support the spondylium in one of the specimens.

Charles Summerson  
U. of Illinois

Information on Ky Pennsylvanian

Send H. W. Scott, Univ. of Illinois samples of *Estheria* shells or any other freshwater from Devonian.

Took up article in AAPG on Sly Gap.

Divisional geologist Leslie Clark or Rex McLee. Shell at Centuria

Get Dawson on Devonian of Southern Indiana



(93)

2037

September 19.

Yesterday in <sup>Cloud's</sup> Cooper's office saw specimens of *Spirifer lucasensis* etched from the "Grand Tower" at the sinks west of Alto Pass. These beds cannot be far below *Microcyclus* and are probably about the same as the *lucasensis* beds at Mountain Glen and 1.5 miles west of Jonesboro.

Spent day going from Urbana to Cape Girardeau. Called at Centralia to see Leslie M. Clark of Shell Co. He held out little hope of getting well data from his company but I am to write him in late October or November for permission to get cores now in Cloud's possession.

The complete *Sp. acuminatus* in Savage's collection has a very sharp fold, steeper than *Sp. acuminatus*. It is much more like *Sp. Brownockeri* to which the species from the Grand Tower may belong.



Sept. 20

Write C. D. Dumban and ask if Savage's collections are at Yale.

Examined Kemmick & Maquoketa (Fernvale on river front just N of the main ST in Cape Girardeau. In the uppermost Fernvale I saw what appeared to be several valves of *McEwenella*, the short narrow variety *M. reynoldi* Foerste.

### Chronister's place

1 at 8'  
6 at 13'  
Rest at 17'

Cistern at SW corner of house just at base of slope which extends upward to the south. First bone at 8 1/2', others down to 17' all in stiff dark clay, resting on limestone. Total hole is 24' about 9' in dia which was blasted out. Also found piece of fossil wood.

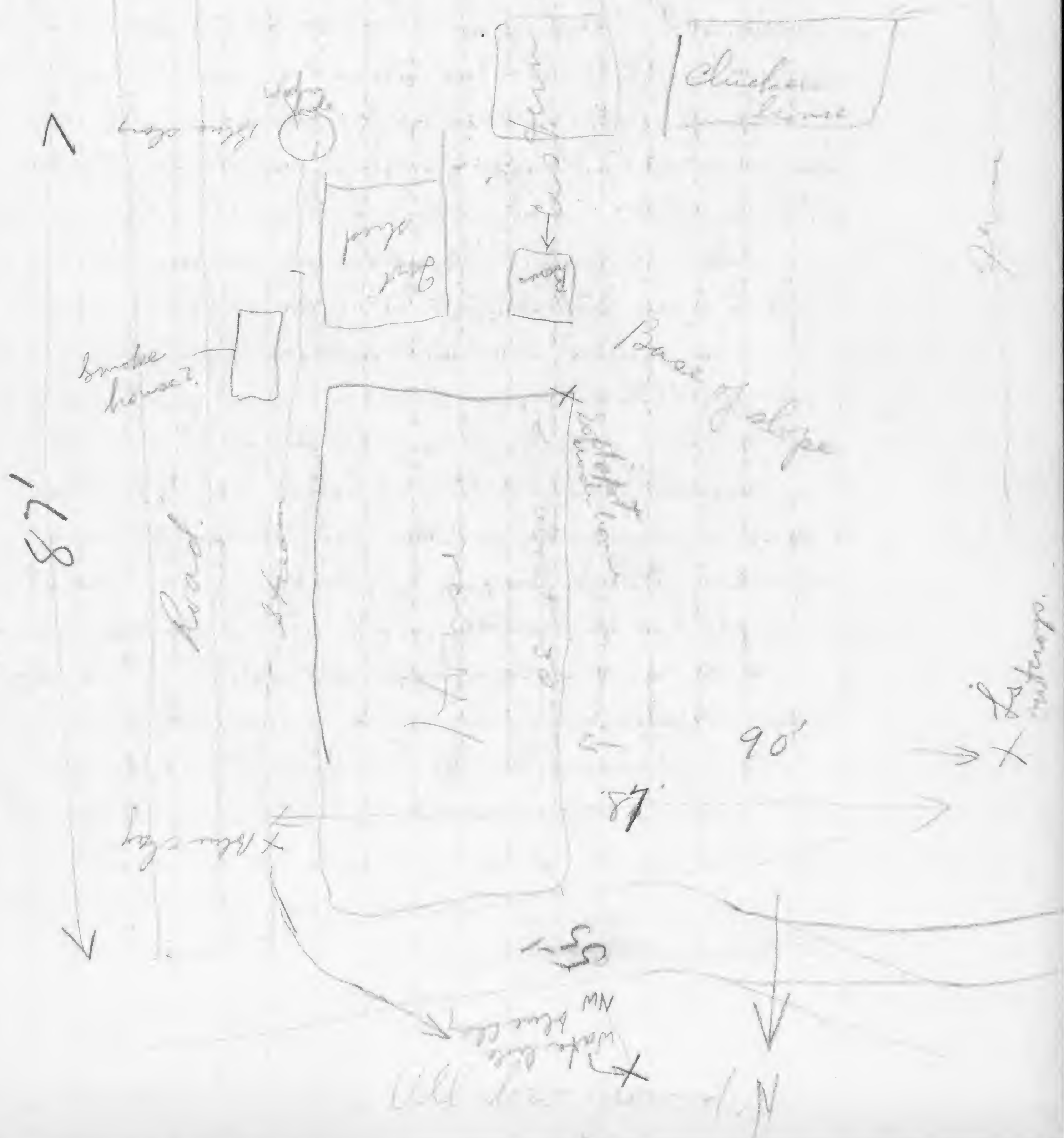
C.P. Burns claims this is a sink and old line of sink went along near chicken house.

House beside ditch from water hole rests on nearly flat ground at very base of slope and must rest on most of clay particularly if



6' below  
Hole 9' wide at top

Slope with St Peter  
sandstone flat



95

2050

Old. Kurno is right about the old sink. Slope has crept over old sink. About 30 yds west of house small block of limestone appears in place about 5' above flat. Slope extends west all along the road. To north of road into house the land is low with a small stream alongside the road. The limestone looks very much like Plattin.

Dirt from well all thrown into bed of road leading to house not mixed with sand and rock.

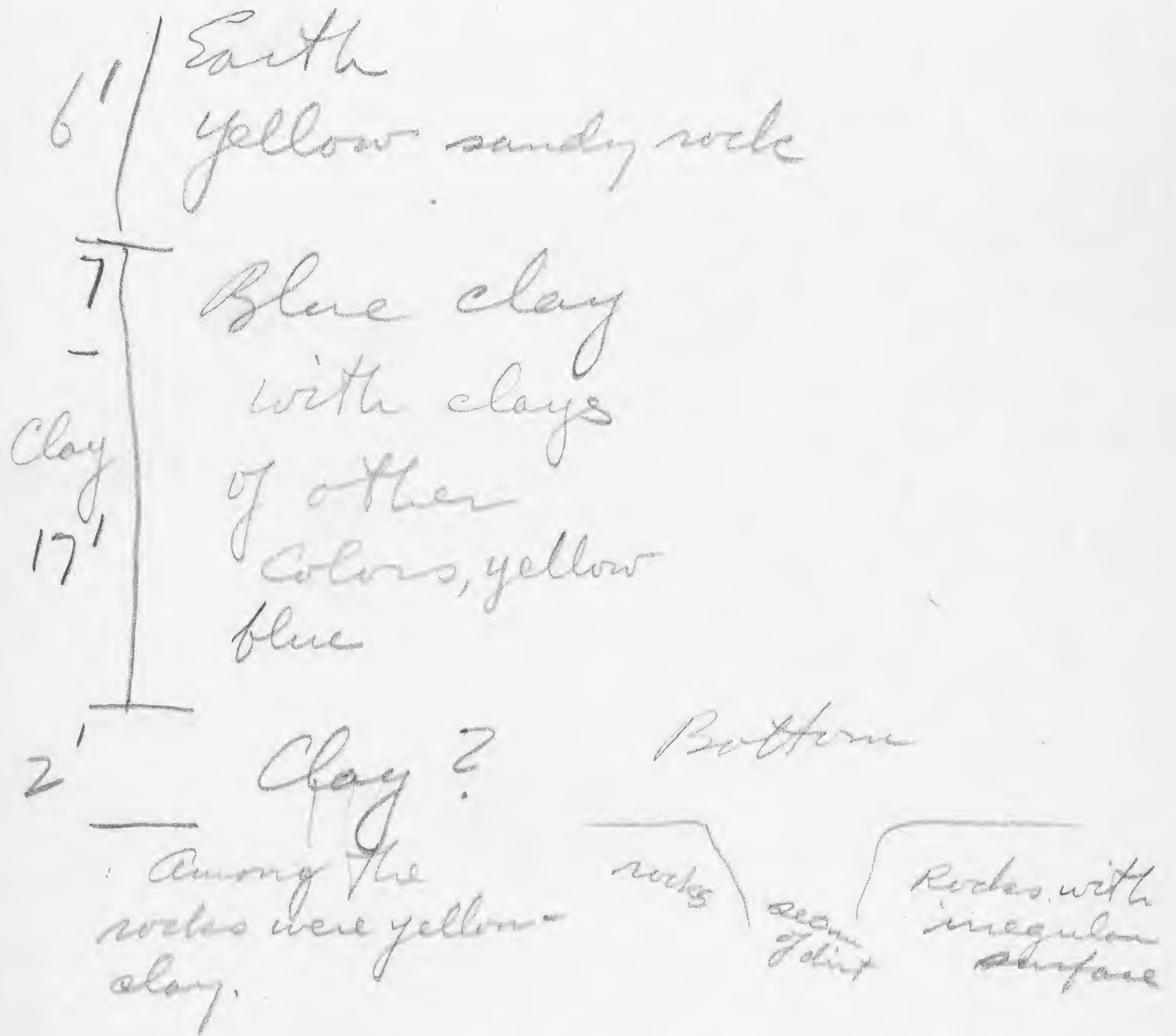
NE corner of house is on a soft space. Blue clay appears in the branch on NE side house and in field to NW of NW corner of house about 5-5'.

The limestone from the well was in form of loose blocks. Base of slope from back of house through cistern

Bones became more abundant toward the ls.

Family would like \$50 for all the specimens.





The surface of the ls. was very irregular  
probably solution

(96)

2040

The 8' bone is smallest, the intermediate ones at 13' and the largest were at 17'.

Chronisters have one more bone. All buildings will probably have to be moved for the excavation.



(97)

2041

September 21

Collected at Mt. Glen and Darty Creek. In ~~first~~ Glen to north from main road to Alto Pass on road up Darty Creek the Dutch Creek is just N of the ~~apt~~ bridge over the little stream. This exposure is in the same stream that Keller had his Grand Tower and is about 50 yds ~~upstream~~ downstream from the Grand Tower. The Grand Tower contained Centronella and is undoubtedly genuine Grand Tower.

September 22

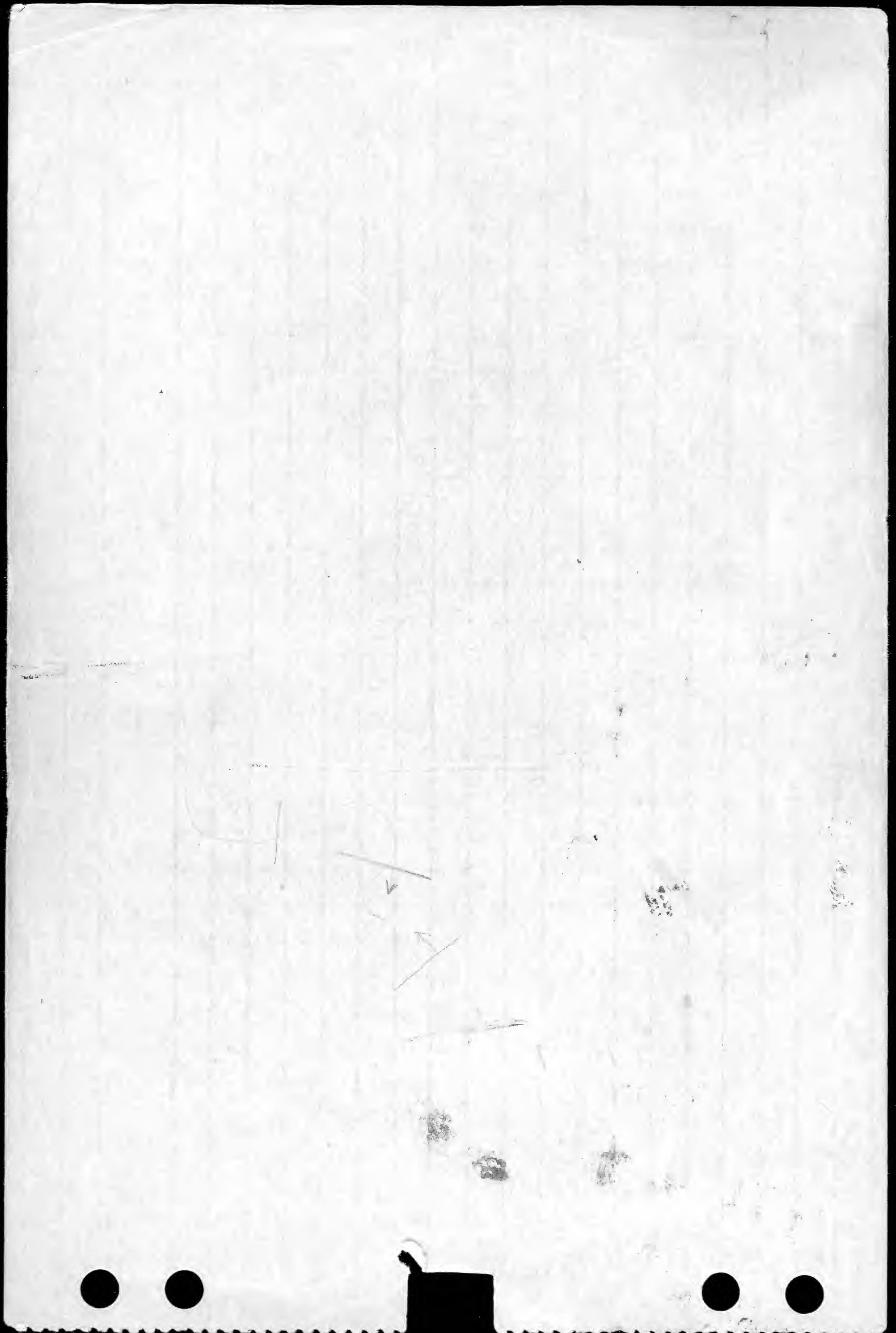
Anna to Mattoon. Called on Mr. C. B. Anderson of Gulf Oil. Well received and given several cores.

Sept. 23.

Spent morning at Gulf offices. Afternoon Mattoon - Knightstown, Indiana.

Sept. 24.

5483?





Sept 12 1964

7g

On N line of sec. 8-34 N-6 W, about 0.3 mile E of NW cor of section, 1.3 miles east and 0.4 mile N of Boyshore, Boyshore (15') Q, Michigan

mm

Blue shale with fossils in lower 3'

G 20'

F 18'

Brown, fine-grained limestone with small *Microspirifer* and *Conocardium*.

E 4"

brownish black shale

D 2'-3'

Hard brown, porous ls. granular, becomes shaly laterally to north

C 4"

brown shale

12-15'

B

Chocolate brown, granular porous limestone. Finger *Favosites* near bottom

A 5-6'

Upper blue shale of Pohl.

Bed D changes to shale with many fossils and becomes about 4' thick north along the trench. Shale crinoidal at base and with abundance of a *Pentamerella* suggestive of *P. gettokeyensis*. Lower 5' of B very fossiliferous. Bed B thins to 3 or 4' at north end of cut. Upper part contains many *Pentamerella* and is just under shale of bed D. A = upper Blue; B = Charlevoix; D-G = Petoskey.

Sept 15, 1964

South side road 0.7 mile due west of Posen. Brown bituminous limestone of Newton Creek fm. Few fossils.



515<sup>1</sup> 1964

1.4 miles due West of Posen  
on south side of road. Lower  
part of outcrop of shale with  
*Atrypa* and *Leptostrophia* for about  
2'. Overlying the shale is 2' of  
limestone, chinnoidal and with  
abundance of goniatitoids.  
Belongs in lower Alpena.

515<sup>2</sup> 1964

0.9 mile west of SE cor 7, 2.9 miles  
west of Posen. Light gray-weathering  
limestone with pink *Vabes*, graptolite  
and *Fongiopina eumekensis* =  
Gravel Point = Alpena.

515<sup>3</sup> 1964

Angular massive limestone  
with *Pentamerella*, large *Spirifer*,  
large *Atrypa* and large *Elythra*, one  
mile east and  $\frac{1}{2}$  mile South of Leers.  
SE cor 5-32N-6E, Alpena Co., Mich.

515<sup>4</sup> 1964

Exposure on Long Rapids road  
at Orchard Hill, begins 0.1 mile  
W of section corner and extends  
for 675', S side NE  $\frac{1}{4}$  31-32N-5E,  
Alpena Co. Mich.  
Section on next page

Section 0.1 mile W of  
SE corner NE 1/4 sec. 31.

J ?	like G.
I 3'	covered
H 3'	gray shale, 1/2' of ls. 1/2' above base digitate corals, Crinacna, and Athyris
G 7'	Hard, moderately thick-bedded ls., smooth dove-gray with "birds-eyes" and occasional corals. Some thin shale partings.
F 3'	Hard brown limestone with small digitate corals = Cladopora?
E 4'	Shaly gray limestone with many large Cyrtina
D 2'	Shaly blue gray limestone with many fenestellids
C 1'	Hard granular ls.
B 4'	Shaly limestone with many Microspirifer, Pentamerella = 446
A 3'	granular massive limestone



S 155 further W of preceding -  
SW cor NE 1/4 sec. 31

May be same as upper part  
of S 154 - Beds G & H. ?

C 2 1/2'

Shaley limestone with ls. bands, digitate  
fossils and Strophodonts

B 2'

Massive baf, many digitate corals,  
spaghetti-like stromatopora and large  
stromatopora - often overturned

A 8-10'

Platy blue gray limestone, very  
flat bedding

B & C probably belong together  
A suggests G or I of preceding  
section

# Genshau

Rabiteau Farm - section  
N.E. of Rabiteau house near N  
line NW  $\frac{1}{4}$  sec. 35-33 N-8 E.,  
Presque Isle Co., Mich.

F 2'	Platy limestone with <i>G. romingeri</i> and round, globular <i>Pentamerella</i>
E $1\frac{1}{2}'$	Crumbly shale with small brachiopods - <i>Helaspis</i> common
D 3"	limestone
C 3'	Crumbly shale like A with <i>G. romingeri</i>
B 6"	limestone with numerous <i>Hexagonaria</i>
A $1\frac{1}{2}'$	crumbly limey, nodular shale with numerous small brachiopods: <i>chonetids</i> , <i>Strophodontata</i> , <i>G. romingeri</i>